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ELECTRIC RAILWAY JOURNAL

43

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REPUBLIC

Republic Knight-Motored Bus

A Distinctive Achievement

Created by the World's Largest Exclusive Manufacturer of Motor Trucks especially for the use of

Public Utility Companies

AFTER exhaustive study of the methods and experience of the largest successful Motor Bus operators of Europe and America, the Republic Motor Truck Co., Inc., has specially designed, and now offers, the *Republic Knight-Motored Bus*, to help solve the problems of Public Utility Companies in the extension of their passenger transportation facilities.

Our *Public Utility Division*, under the direction of an expert Electric Railway operator of long experience, co-operates with Public Utility Companies in studying the needs of their various lines and the possibilities and desirability of Motor Bus use. This Department may be consulted in confidence without obligation.

REPUBLIC TRUCK SALES CORPORATION, Alma, Michigan

Weather and the Law of Averages

MID-SUMMER heat turns many minds from thoughts of Winter's severity. Indications are that 1921-1922 will include a real winter in snowy climates because recorded temperatures are already greatly in excess of the fifty year average. Rarely are there ever two consecutive mild winters, hence those electric railway companies who take the chance on a repetition of last winter's mildness will most likely face another 1919-1920 calamity.

Preparation at once for a severe winter is, therefore, the plan of the wise operators. Their sweepers, snow plows and other winter service and road-way equipments will be overhauled; inadequate devices replaced; and all motors renewed by dipping and baking every armature and field of the older types.

Westinghouse 306-CV, 65 hp. or No. 548-A, 100 hp. motors have sufficient capacity to perform sweeper and plow service with reliability.

Westinghouse electric baking ovens are used extensively by some of the largest traction systems of the country.

Westinghouse Railway Operating Data gives very valuable information on the dipping and baking of railway equipments. This publication is prepared especially for operators and will be sent on request.

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

Westinghouse

Vol. 58, *No.* 10 New York, September 3, 1921 *Pages* 345-384

Electric Railway Journal

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing-Editor

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Optimism Prevails in Salt Lake City Traction Circles

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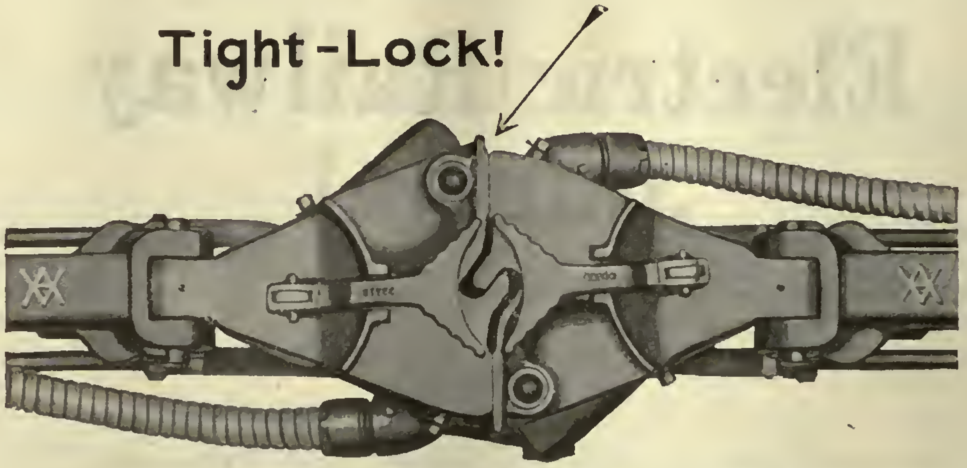
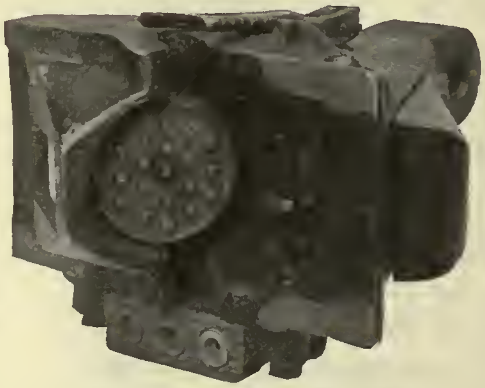
Tight-Lock!



Car, Air and Electric Coupler

AUTOMATIC type K-1-A



Coupler Head, Showing Electric Portion and Lock Reset Trigger.

THE K-1-A does just what it was always hoped an automatic coupler would do.

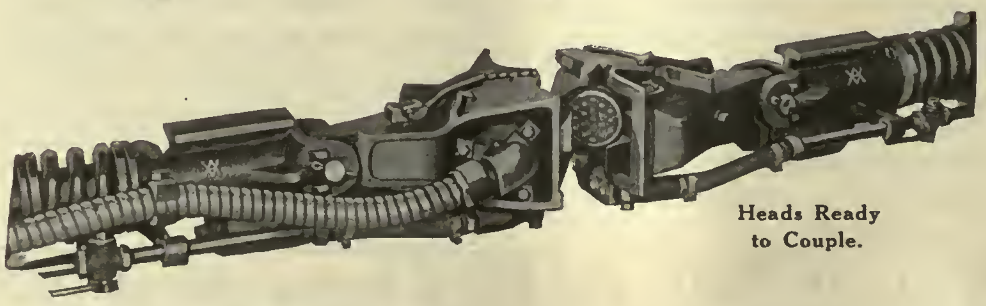
Its complete practicality is vouchsafed by electric railway officials who have adapted it to their operations, subjecting it to the actual test of hard, every-day service over a period of years.

Three operations in one—the impact of the couplers locking the cars securely together; establishing rigid, tightly-sealed air connections, and forming electric connections with clean contacts which insure full carrying capacity without over-heating.

Designed in the interests of HUMAN SAFETY and TIME ECONOMY. Adapted for multiple motor, or motor and trailer, operation.

The K-1-A can be furnished with or without the electric portion, provision being made so that this feature may be added at any time.

Send for new Descriptive Catalog Unit T-2029



Heads Ready to Couple.

WESTINGHOUSE TRACTION BRAKE CO.

General Office and Works, Wilmerding, Pa.

ATLANTA
BOSTON
COLUMBUS, O
HOUSTON, TEX.

CHICAGO
DENVER, COL.
MEXICO CITY
NEW YORK

PITTSBURGH
SAN FRANCISCO
ST. LOUIS, MO.
SEATTLE, WASH.

ST. PAUL, MINN.
LOS ANGELES
SALT LAKE CITY
WASHINGTON

SAFETY CAR a Standard with the City of Detroit

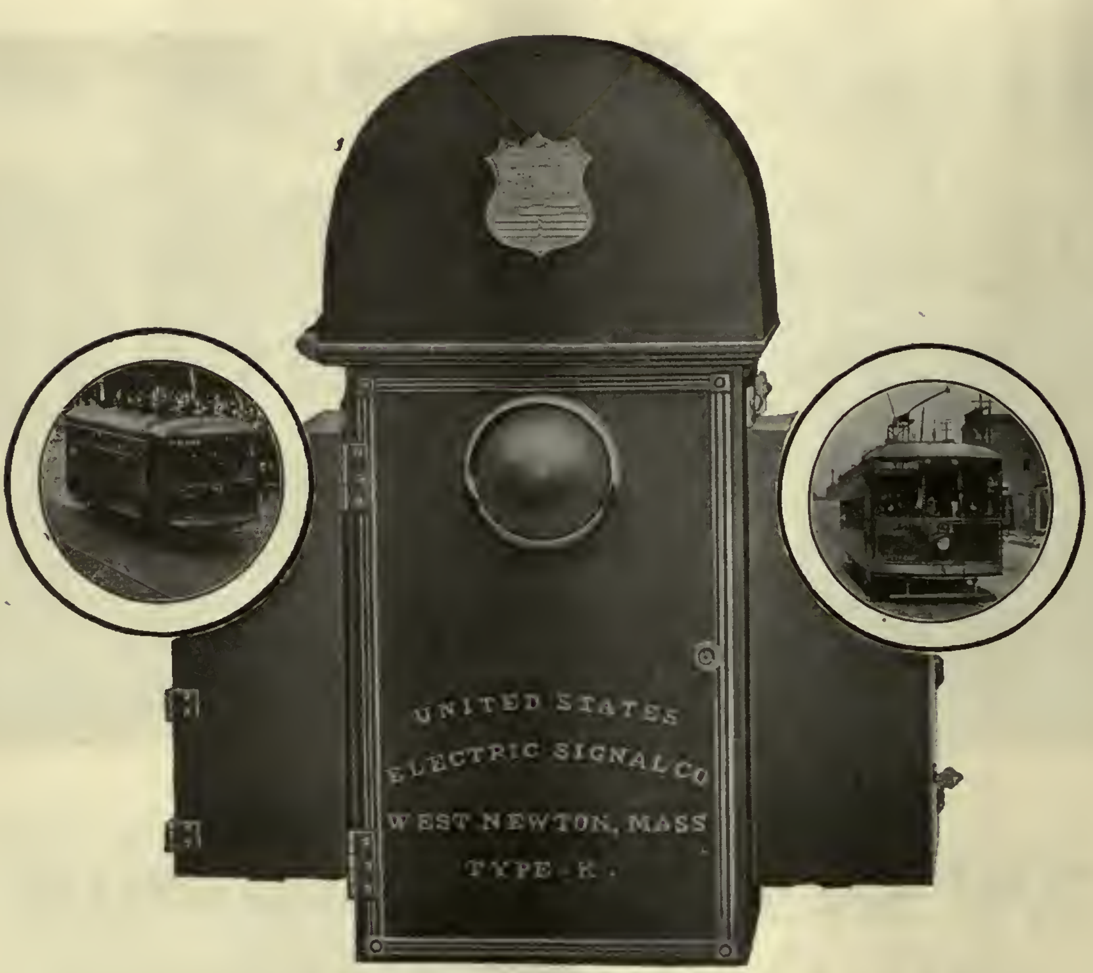
250 IN SERVICE OR ON ORDER

THE City of Detroit, Department of Street Railways, has chosen Safety Cars as a standard of operation on the new Municipal System now in course of development. An initial order of 25 units of this type proved so satisfactory over a long period of service that additional orders recently placed will bring the total up to 250.

Detroit's progressive policies since it undertook the development of the Municipal project have been the subject of considerable discussion in the Traction field. The action of the management in turning to Safety Cars for approximately 85 per cent of future operations is additional evidence of progressiveness, and may also be regarded as further indorsement of the Safety Car's achievements in other great Metropolitan cities, including Boston and New York.

SAFETY CAR DEVICES CO.
OF ST. LOUIS, MO.
Postal and Telegraphic Address:
WILMERDING, PA.
CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH

It is not a Safety Car unless equipped with our standard Air Brake and Safety Car Control Devices.



IMPROVE SAFETY CAR SERVICE

ECONOMICALLY AND EFFICIENTLY

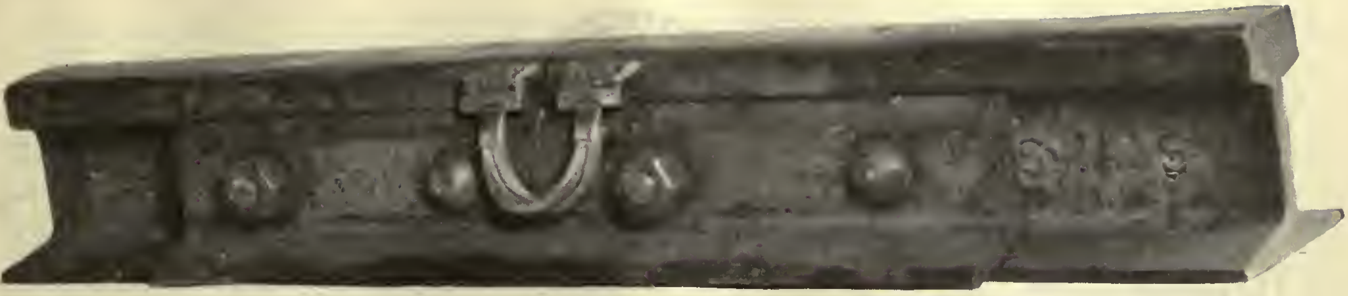
United States Electric Signals serve as schedule guardians. They take the place of despatchers and inspectors without appearing on the weekly pay rolls. They are always on the job, twenty-four hours per day, never off for lunch or on vacations, and they never worry about over-time.

United States Electric Signals are automatic. There is no human element involved. The trolley wheel on the car operates the signal.

Safety cars can be operated on single track on closer headways and faster schedules, and still be safe, in fact as well as name, when protected by the reliable service of United States Signals.

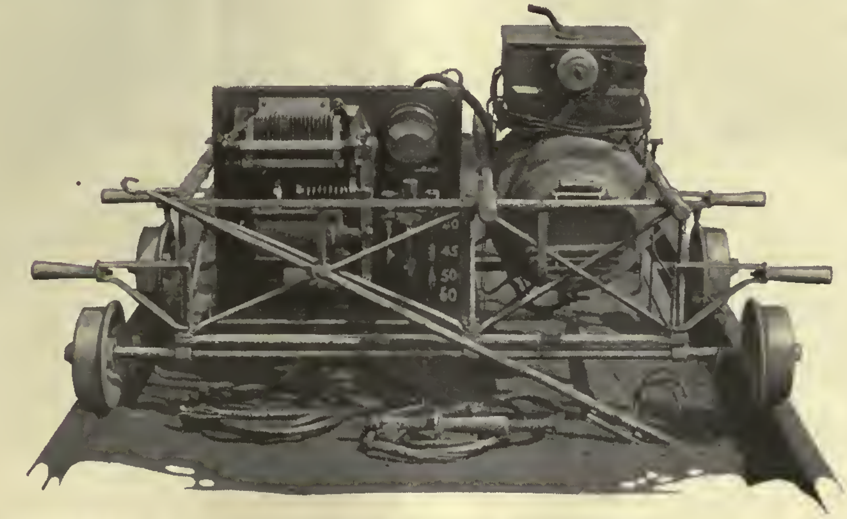
A generation of success in signal specialization stands back of United States equipment.

United States Electric Signal Company
West Newton, Mass.



O-B Type AW-3 Bond—Patented.

Contributes its share to good work. Metal is built up in 90° angle—good electric welding is not possible in an acute angle. Steel welding surface. Copper shielded from intense arc heat. Sleeve increases cable life.



Wilson **Plastic-Arc** Rail Bond Welder

Automatically establishes ideal welding conditions

As soon as a man starts to use the Wilson Plastic Arc Rail Bond Welder, he learns the secrets of the Master Welder's success.

The Wilson machine is a dynamotor regulated by an ingenious, though simple, control apparatus.

The striking voltage is comparatively high but the welding voltage is low. The operator must use the correct, short arc which makes a dense, tough, strong weld.

Welding current is closely controlled and does not vary more than 5%. Short circuit current is held to 10% above normal. Constant current and the short arc combine to give uniform heat—and uniformly good welds.

Because it is capable of continuous duty, the Wilson **Plastic-Arc** Rail Bond Welder is useful for general repair welding as well as rail welding and bonding. Prompt shipment.

Interesting, illustrated booklet free on request.

A Popular Mounting

For city work this auto trailer mounting of the Wilson Plastic-Arc Welder is convenient. One city uses three of them. The Welder is also furnished to run on the track or it may be assembled on a hand car.

The Ohio Brass Co.
Mansfield, Ohio, U.S.A.

New York Philadelphia Pittsburgh Charleston, W. Va. Chicago Los Angeles San Francisco Paris, France

Products: Trolley Material, Rail Bonds, Electric Railway Car Equipment, High Tension Porcelain Insulators, Third Rail Insulators

1903 NORTHWESTERN PACIFIC 1921

EIGHTEEN YEARS OF SERVICE

prove the efficiency of *UNION* automatic block signals controlled by continuous A. C. track circuits.

In 1903 the first A. C. track circuits ever installed were put in service on the Northwestern Pacific. They are still giving entire satisfaction.

"Safety AND Economy"

Trade Mark **Union Switch & Signal Co.** Trade Mark

SWISSVALE, PA.

WATER AND ICE EQUALS TRACK TROUBLE!

DO the Ties in your track foundation absorb water to freeze and start cracks in the foundation concrete? The action may be slow but it is inevitable if your ties are wood.

STEEL TWIN TIES reinforce the track foundation concrete as all permanent concrete structures are reinforced. This advantage is obtainable at a large saving in first cost over wood-tie construction.

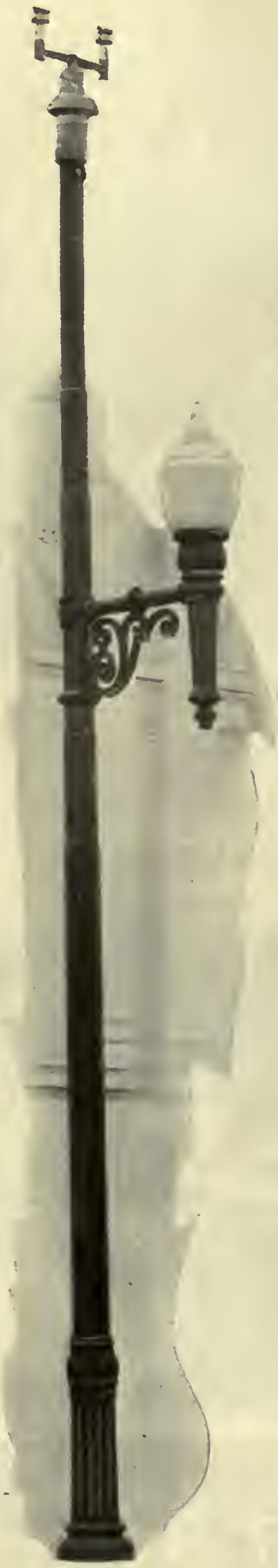
The complete data are arranged for a permanent place in your files. *Ask for it today!*

THE INTERNATIONAL STEEL TIE COMPANY, 16702 Waterloo Road, Cleveland, O.

Manufacturers of Steel Twin Ties and Crossing Foundations

International Steel Twin Ties manufactured and sold in Canada by Sarnia Bridge Co., Ltd., Sarnia, Ont.

Steel Twin Tie Track



ELRECO

Combination Poles

The Ideal White Way for Progressive Cities

The advantages of a brilliant "white way" illumination for main streets are easily seen. In hundreds of modern cities the residents like the bright cheerful lighting, the merchants find that adequate lighting pays good returns in increased business.

The usual objection to the erection of "white way" lighting, the objection to the first cost, is done away with in Elreco ornamental combination Railway and lighting poles. This construction carries the span wires of the street railway, the lighting wires, and the ornamental lamp standards.

The cost may be divided between the street railway, the lighting company and the business interests facing the street.

Besides making the expense a very moderate item, the best type of illumination is provided in this way. One Elreco pole carries the wires and lamps, avoiding duplication of poles and wires, and reducing the overhead obstructions.

Send for full description of this utility pole

The Electric Railway Equipment Company

Cincinnati, Ohio

30 Church Street, New York City

KEYSTONE

It's a Light Steel Gear Case riveted and spot welded.

Its light weight multiplied by the number of cars you operate will total a figure that will prove interesting alongside the total weight of cast iron cases your power has to move.

Try this oil-tight, dust-proof, reinforced KEYSTONE GEAR CASE and see for yourself why we call it *"a real case of real service."*

Made for use with all types of motors.

Remember, now, these points
STEEL—LIGHT—RIVETED—WELDED—STRONG—TIGHT—RIGID

ELECTRIC SERVICE SUPPLIES Co.

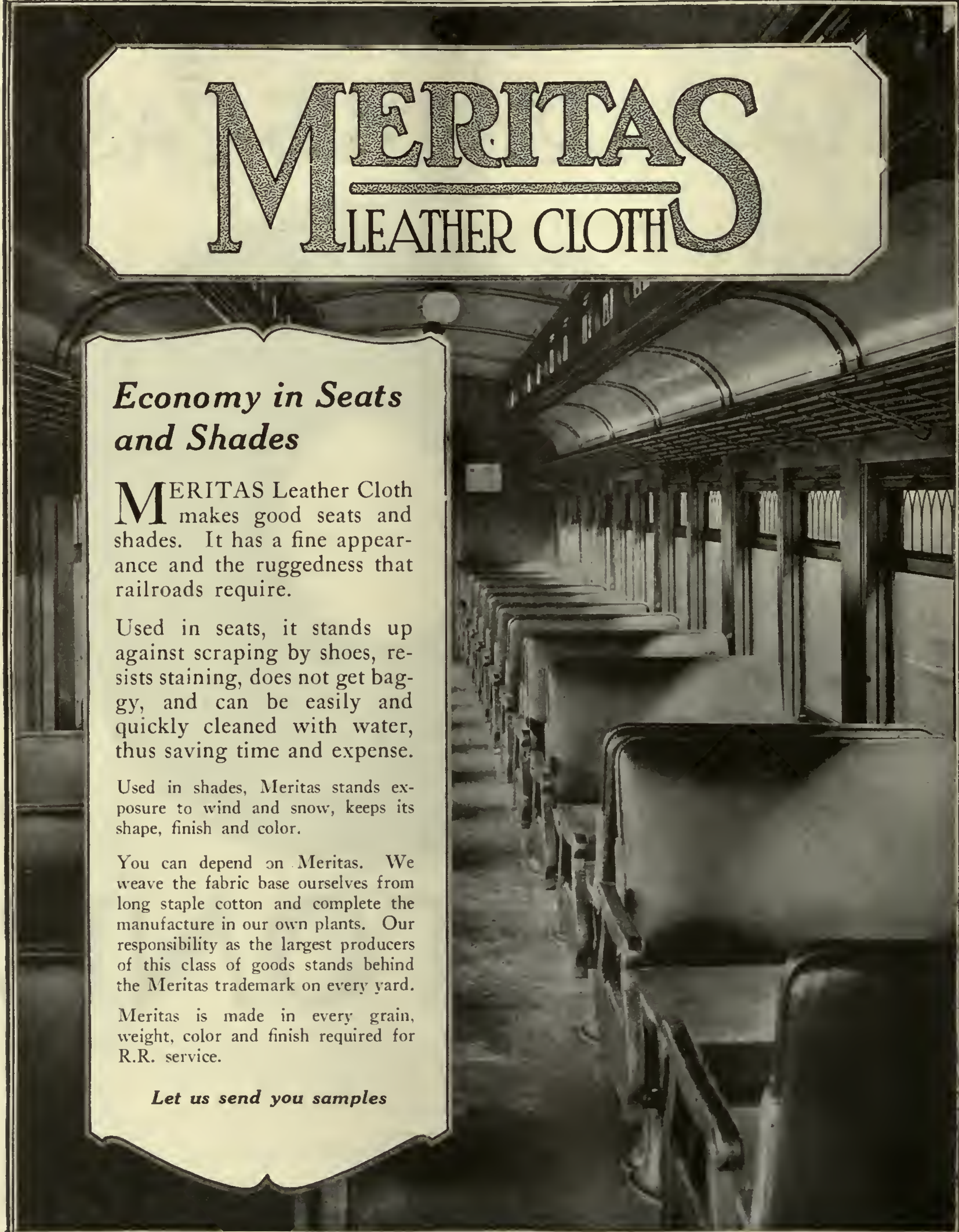
Manufacturer of Railway Material and Electrical Supplies

Branch Offices: Boston, Scranton, Pittsburgh
Canadian Distributors: Lyman Tube & Supply Co., Ltd., Montreal, Toronto

PHILADELPHIA
17th and Cambria Streets

NEW YORK
50 Church Street

CHICAGO
Monadnock Block



MERITAS
LEATHER CLOTH

Economy in Seats and Shades

MERITAS Leather Cloth makes good seats and shades. It has a fine appearance and the ruggedness that railroads require.

Used in seats, it stands up against scraping by shoes, resists staining, does not get baggy, and can be easily and quickly cleaned with water, thus saving time and expense.

Used in shades, Meritas stands exposure to wind and snow, keeps its shape, finish and color.

You can depend on Meritas. We weave the fabric base ourselves from long staple cotton and complete the manufacture in our own plants. Our responsibility as the largest producers of this class of goods stands behind the Meritas trademark on every yard.

Meritas is made in every grain, weight, color and finish required for R.R. service.

Let us send you samples

THE STANDARD TEXTILE PRODUCTS CO.
320 BROADWAY, NEW YORK
Dept. E. R. J.

MERITAS
STANDARD
STP
TEXTILE PRODUCTS
BRAND
REG US PAT OFFICE

Modernize! *Pneumatize!*

What Every Modern Grocer Knows

The average grocery clerk isn't paid as much for his time as your motormen and conductors, but how often do you see a clerk in a real store grinding coffee by hand?

And yet, grinding coffee by hand isn't half as strenuous or one-tenth as frequent a job as opening and closing car doors; but wise grocers don't put up with it any more since, possibly your own central station department showed them that the electric motor gives the clerks time to attend to more customers and with less distraction.

If the use of power is a good thing in a grocery, it is a better thing on a car where *time* is a far more essential element. The relief from avoidable drudgery will not only raise the morale of your men, but will also enable them to

Concentrate on the care and fare of the patron

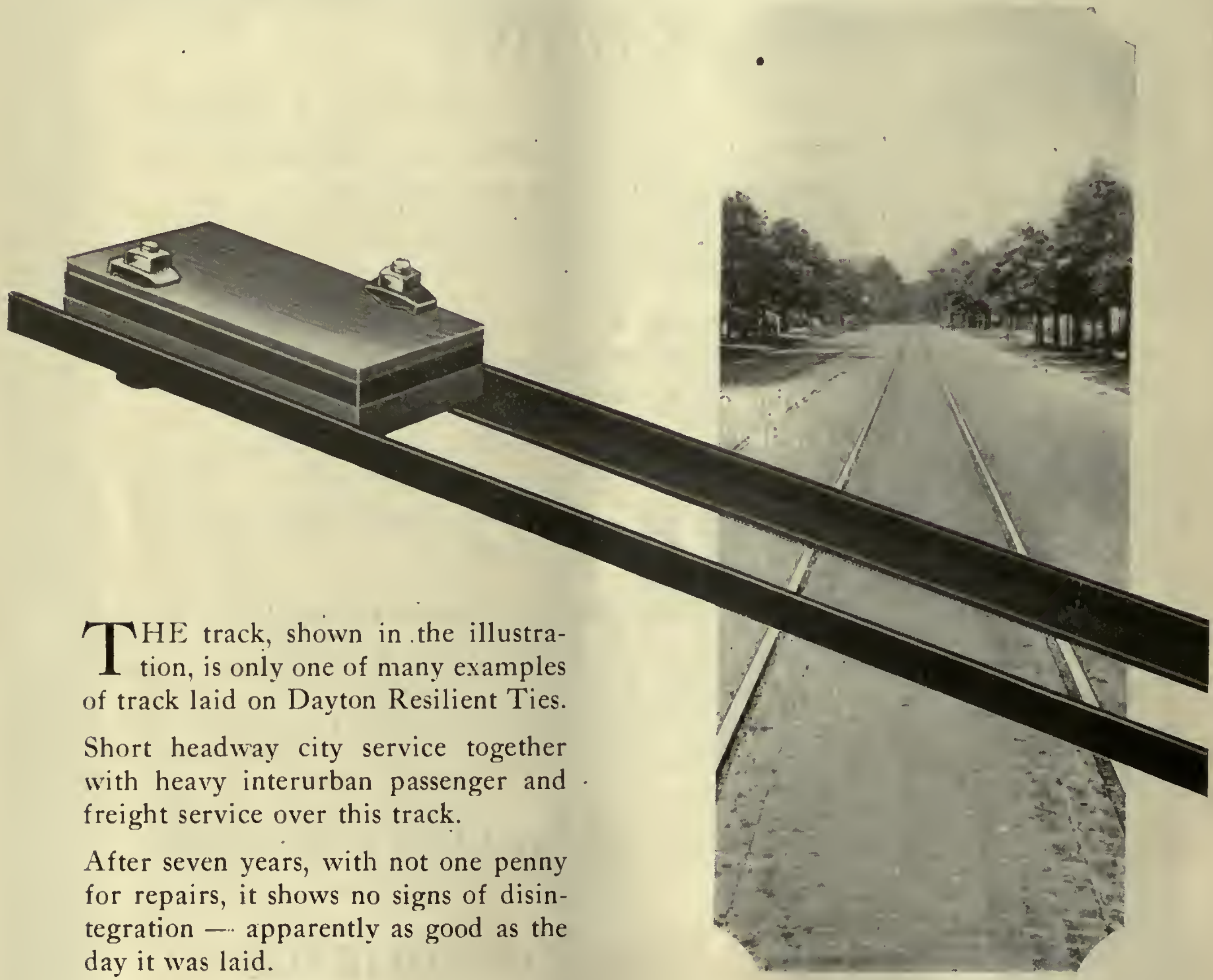
National Pneumatic

Door and Step Control
Motorman's Signal Lights
Door and Step Operating Mechanisms
Safety Interlocking Door Control
Multiple Unit Door Control

Manufactured in Canada by
Dominion Wheel & Foundries, Ltd.
Toronto, Ont.

National Pneumatic Company, Inc.
Originator and Manufacturer
50 Church St., New York
Edison Bldg., Chicago
Works: Rahway, N. J.

If the money wasted could be dug out as average right-of-way



THE track, shown in the illustration, is only one of many examples of track laid on Dayton Resilient Ties.

Short headway city service together with heavy interurban passenger and freight service over this track.

After seven years, with not one penny for repairs, it shows no signs of disintegration — apparently as good as the day it was laid.

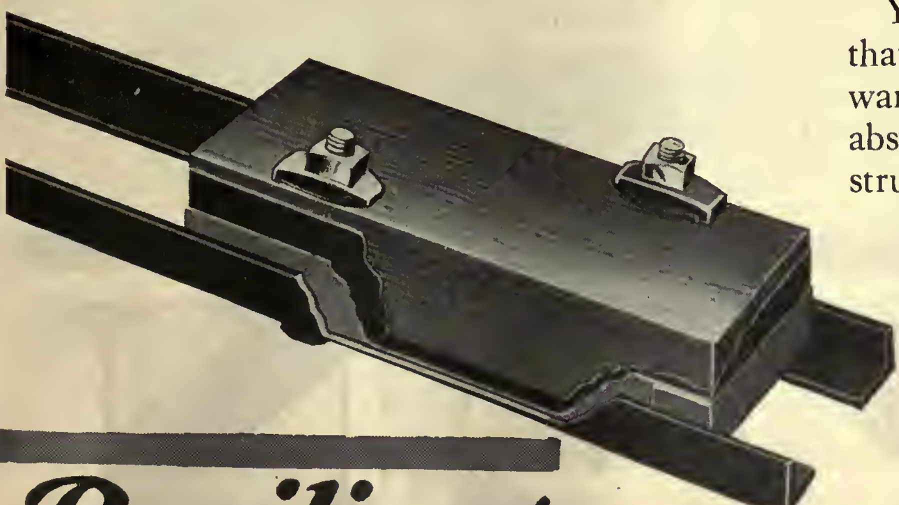
DAYTON

on track construction easily as it's put in, the would be a gold mine

It's a fact. When you stop to consider that every dollar put into track-laying *beyond the amount required for permanent, high grade construction* is actually wasted—thrown away—buried in your roadbed beyond recall—you'll realize the truth of this statement.

For example, when you lay a mile of track on wood ties in a concrete foundation you're burying 6,000 hard earned dollars along with it, because this type of track costs $6,000 per mile *more* than the same track laid on Dayton Resilient Ties. And the same thing applies to track laid on wood ties on gravel ballast. The cost is $2,000 per mile greater than similar track laid on Dayton Resilient Ties.

But this remarkable saving in first cost is by no means the entire saving. After your track is laid on Dayton Resilient Ties you commence to enjoy marked maintenance economies as well. Your tracks and paving last longer. Repairs are decreased. Upkeep of rolling stock is reduced to a minimum and traffic noise eliminated as far as is humanly possible, all because of the *resiliency* of Dayton Resilient Ties—a feature found in no other type of track construction.



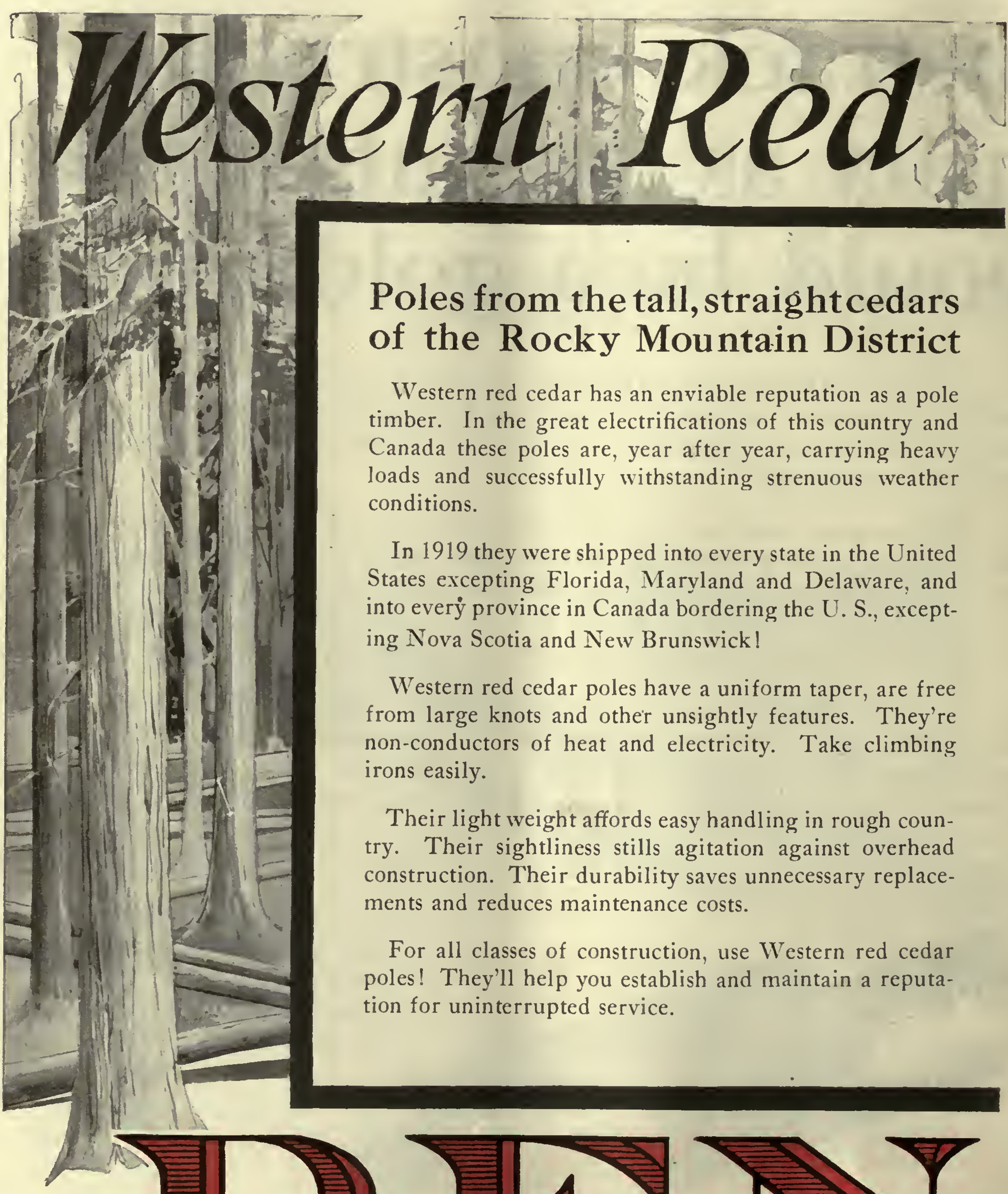
You want to save money on that next track job—and you want a better track. Have the absolute facts about track construction laid before you.

Just a line will bring literature and full descriptive details.

Resilient TIE

The Dayton
Mechanical Tie
Company
Commercial Building
Dayton, Ohio

Western Red



Poles from the tall, straight cedars of the Rocky Mountain District

Western red cedar has an enviable reputation as a pole timber. In the great electrifications of this country and Canada these poles are, year after year, carrying heavy loads and successfully withstanding strenuous weather conditions.

In 1919 they were shipped into every state in the United States excepting Florida, Maryland and Delaware, and into every province in Canada bordering the U. S., excepting Nova Scotia and New Brunswick!

Western red cedar poles have a uniform taper, are free from large knots and other unsightly features. They're non-conductors of heat and electricity. Take climbing irons easily.

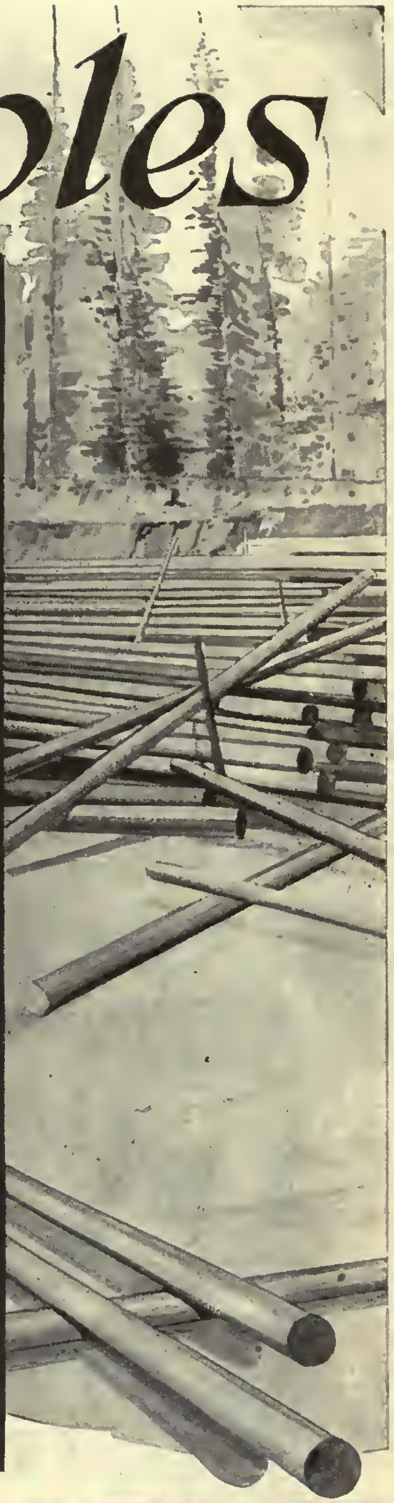
Their light weight affords easy handling in rough country. Their sightliness stills agitation against overhead construction. Their durability saves unnecessary replacements and reduces maintenance costs.

For all classes of construction, use Western red cedar poles! They'll help you establish and maintain a reputation for uninterrupted service.

PEN

Patented Process

Cedar Poles



New Pentrex Process—a revolutionary departure in butt-treating

The Pentrex process marks a great achievement—a very definite step forward in pole preservation.

By this method a scientific penetration of preservative is attained. Think what this means in added durability and of the tremendous saving in replacement!

A satisfactory penetration is accomplished by first puncturing the pole throughout the groundline area. This is done by a wonderful, patented machine which overcomes all previous objections to puncturing poles.

A motion picture film showing Pentrex treating will be sent upon request to engineering societies or other responsible organizations.

Write now for Pentrex specifications and full information.

WESTERN RED CEDAR ASSOCIATION
Peyton Building
Spokane, Washington

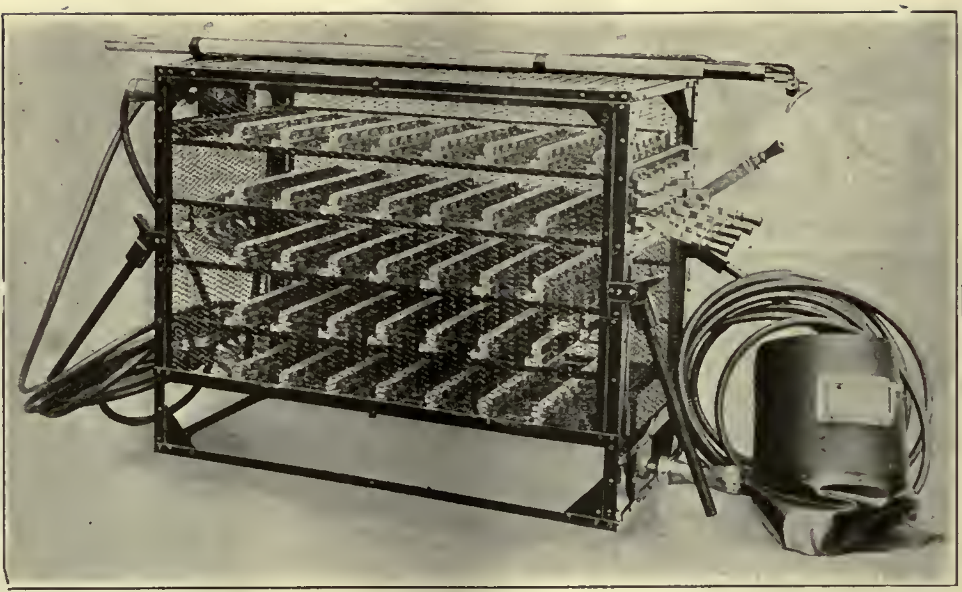
Non-Punctured
Left—Cross section of pole (at butt) showing penetration obtained without puncturing.

Pentrex-ed
Right—Same pole showing penetration obtained in area punctured by the Pentrex method.

TREX

of Puncture Treating

(REG. U.S. PAT. OFF.)



AJAX WELDER

—built by railway men for railway work

After 12 years of experience building, selling and experimenting with grinders for railway track work, which involved much experience with every kind of welding outfit on the market, we saw the need of a welder designed to meet the special conditions of electric railway track maintenance, and developed the Ajax Welder.

As the only builder of track grinders, we had an enviable reputation to sustain, and withheld the Ajax Welder from the market until several years of experimenting and practical tests assured us that we had produced a welder which meant a real contribution to the industry.

A portable electric arc welder—can be carried on any car platform—weighs only 140 lbs.—no moving parts to get out of order—333 amperes at 600 volts.

Use the Ajax Welder with our
Track Grinders

The illustration shows our well-known Atlas Grinder, invaluable for use in connection with welding cupped joints, worn down special work, etc. We also sell the Universal and Reciprocating Grinders.

Write today for details and prices on a complete welding and grinding equipment.

Railway Track-work Company
3132-48 East Thompson St.
Philadelphia, Pa.

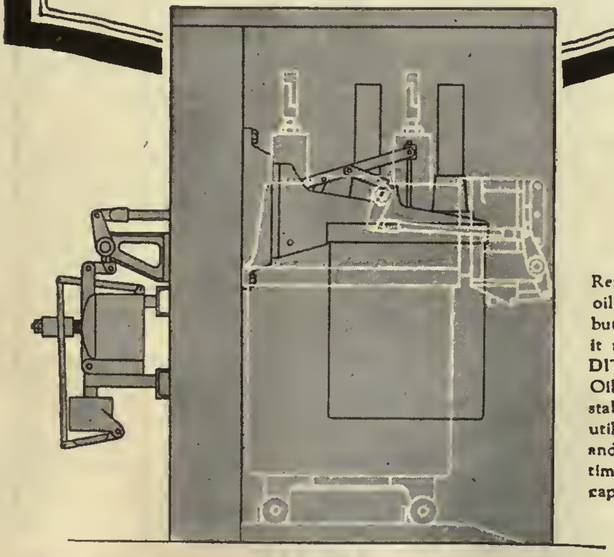
Waste Space

Increased interrupting capacity doesn't always mean rebuilding switch cells or bus structure.

An accompanying illustration shows how the CONDIT F-10 "Removable Unit" Oil Circuit Breaker solves this problem by utilizing the *waste space* in the cells now occupied by oil circuit breakers of the "removable tank" type.

Each CONDIT F-10 Oil Circuit Breaker is a complete, self-contained unit—mounted on a wheeled truck. Easy to install, simply "roll 'em in the cells."

CONDIT ELECTRICAL MFG. CO.
Manufacturers of Electrical Protective Devices
BOSTON 27, MASS.
Northern Electric Company
LIMITED
Sole Distributors for the Dominion of Canada



Removable Tank type of oil circuit breaker utilizes but 35% of the cell space it requires. The CONDIT F-10 *Removable Unit* Oil Circuit Breaker, installed in the same cell, utilizes 80% of the space, and affords from 3 to 8 times more interrupting capacity.

CONDIT

The Conductor and His Job

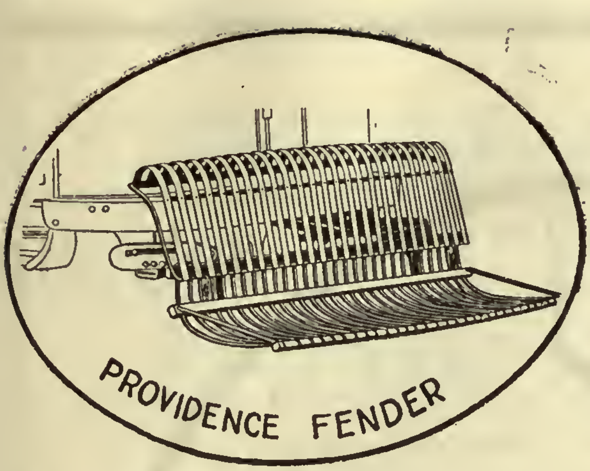
Your conductors are in a position to gain and keep the good will of the public and to build up business for you. Give them a chance.

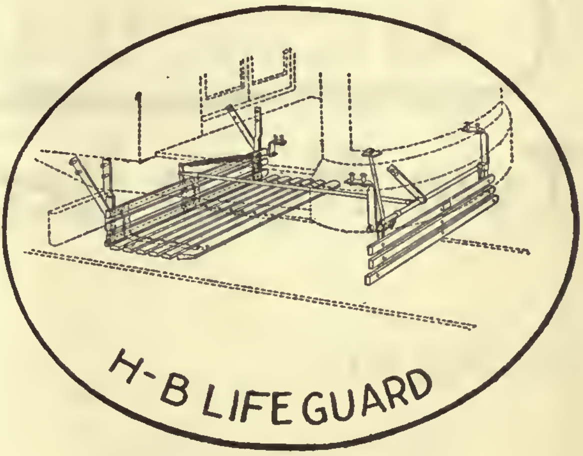
The Ohmer System of fare collecting and fare accounting places the conductor in the position of a responsible sales man of transportation and he soon learns that the better he serves your interests the better he serves himself.

The Ohmer System gives him means for indicating and recording each transaction as it takes place. This is good business. Every successful merchant knows it is the best way to handle sales.

The Ohmer System points out to the managment the characteristic tendencies of each conductor and indicates the sort of discipline which will do the most good. The Ohmer system stands for the best of modern business methods applied to city and interurban electric railroading.

Ohmer Fare Register Company
Dayton, Ohio





Prominent Distinguishing Marks of Sincere Safety Efforts

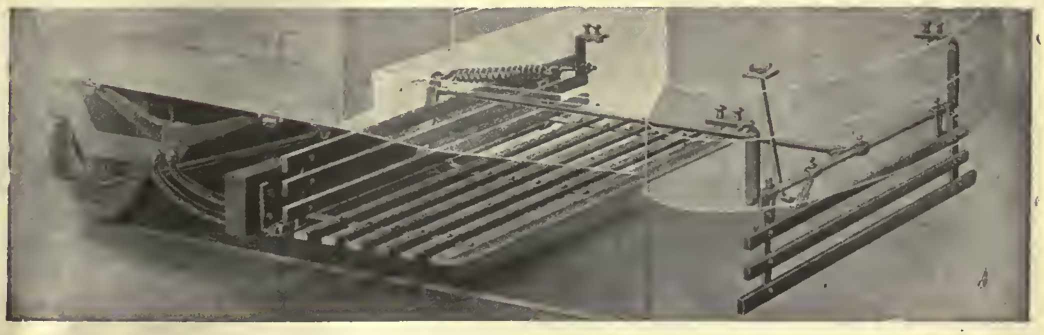
Nothing is more important to a railroad management from a point of economy and saving human lives than safety devices used for the protection of the public. Proper protection is not obtained with make-shift and inadequate fenders, where cars are operating through city streets or country highways often at comparatively high rates of speed.

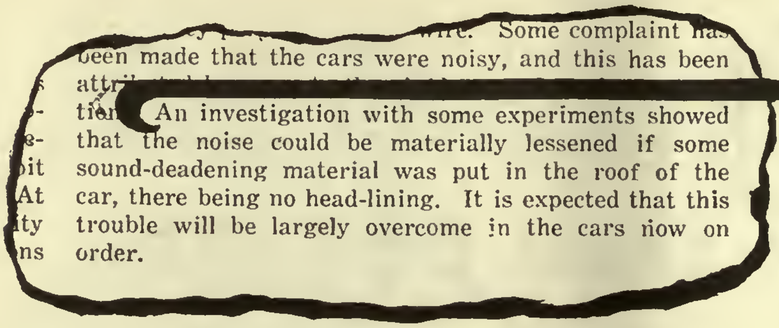
Only the best are "good enough."

Providence Fenders and H.B Life Guards are now so universally used and have been so thoroughly proven in their ability to successfully save the victims of accidents from going under the wheels that they are recognized everywhere as standards of safety.

Consolidated Car Fender Co.
Providence, R. I.

General Sales Agent
Wendell & MacDuffie Co.
61 Broadway, N. Y.





wire. Some complaint has been made that the cars were noisy, and this has been attri

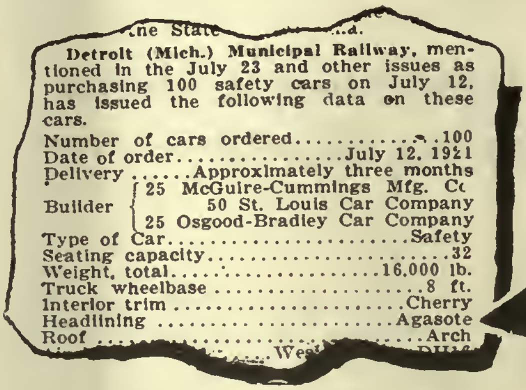
tion. An investigation with some experiments showed that the noise could be materially lessened if some sound-deadening material was put in the roof of the car, there being no head-lining. It is expected that this trouble will be largely overcome in the cars now on order.

From an article on construction of
Detroit Municipal Railway

Electric Railway Journal
July 30

Two News Items

—they tell
their own story!



Detroit (Mich.) Municipal Railway, mentioned in the July 23 and other issues as purchasing 100 safety cars on July 12, has issued the following data on these cars.

Number of cars ordered	100
Date of order	July 12, 1921
Delivery	Approximately three months
Builder	25 McGuire-Cummings Mfg. Co 50 St. Louis Car Company 25 Osgood-Bradley Car Company
Type of Car	Safety
Seating capacity	32
Weight, total	16,000 lb.
Truck wheelbase	8 ft.
Interior trim	Cherry
Headlining	Agasote
Roof	Arch

News item—**Aug. 6**

Specify—

AGASOTE

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For headlinings, roofing and wainscoting in your cars

PANTASOTE

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For your car curtains and upholstery

THE PANTASOTE COMPANY

11 Broadway, New York
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McGUIRE-CUMMINGS MANUFACTURING CO.
CHICAGO

SNOW SWEEPERS

Now is the time to check up on your snow fighting equipment for the coming winter.

McGuire-Cummings Single and Double Truck Snow Sweepers and Plows are "Standard Equipment" on practically every Electric Street Railway Line in the United States and Canada that has snow to contend with.

Specifications and drawings upon request.

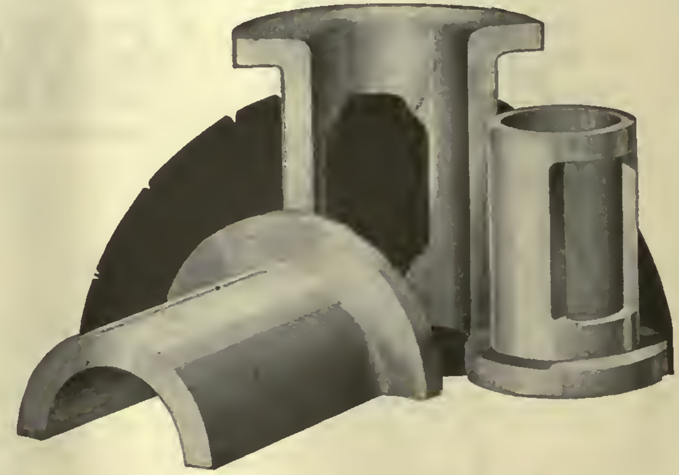
McGUIRE-CUMMINGS MANUFACTURING CO.
City and Interurban Cars and Trucks,
Combination and Work Cars,
Electric Locomotives

GENERAL OFFICES
111 WEST MONROE STREET
CHICAGO, ILL.

"TIGER" BRONZE

"TIGER" BRONZE AXLE ARMATURE BEARINGS

It will pay you to investigate the money saving characteristics of "Tiger" Bronze Bearings and to learn more about the Engineering Service that goes with them. Write today for details—without obligation.



Cold-blooded buying

Marshall Field is credited with once having advised his department heads to "sell with enthusiasm—buy with cold blood."

A good suggestion, too, but often misunderstood by many buyers. Too often is cold-blooded buying regarded as spending the least for material—saving a penny on the purchase price at the sacrifice of a dollar in service.

This applies especially to the selection of axle and armature bearings. "Tiger" Bronze Axle and Armature Bearings, for example, are not made to sell at the lowest price, but to give maximum service, by reducing to a minimum the laying up of cars for bearing renewals and the rewinding of armature coils—by reducing operating expense and maintenance costs—by staying on the job long after cheap bearings have gone to the scrap heap.

That's why, in the final analysis, they are actually the least expensive of all bearings and why they are the choice of many "cold-blooded buyers" with the country's leading Electric Railways.

More-Jones Brass & Metal Co.
St. Louis, Missouri

TROLLEY WHEELS:
V-K Oilless, M.J. Lubricated
HARPS: V-K *Non-Arcing*
BEARINGS: *"Tiger"*
Bronze
Axle and Armature
ARMATURE BABBITT
and Similar Products

MORE-JONES

The World's best Lubricants

GALENA QUALITY

A Mole Hill in Cost
but
A Mountain in Importance

The first cost of lubricating oils is a small item compared with the total expenses of railway operation.

But no single factor exercises a more vital function in determining efficiency of operation than that of lubrication.

There is a distinction between cost of lubricating oils and cost of lubrication. First costs do not necessarily mean final costs. Inferior lubrication demands a tax in repairs and replacements far in excess of the original cost of oils —a tax that *must be paid.*

If this tax—which is inevitable with the use of cheap lubricants—were added to the first cost, the price per gallon would be prohibitive. Yet it is there and is bound to show in the expense column.

Efficient railway executives know that this is a fact; experience and cost records have shown it. It follows that their judgment in specifying *Galena Oils* is simply sound common sense.

The first cost is the final cost and the records on hundreds of electric railways prove that Galena Service is a guarantee of economy, as well as efficiency.

It is not the gallon, but the lubrication units the gallon contains—that count.

TRIGRAM G S O C TRADE MARK

THE GALENA-SIGNAL OIL CO.

NEW YORK FRANKLIN, PA. CHICAGO

Offices in all principal American Cities

LONDON BUENOS AIRES PARIS

GALENA SERVICE

A rail as long as the system and without a joint would be ideal for the power service of a street railway

SF-1 Arc Weld Bond
For attaching to
Rail Head

SF-4 Arc Weld Bond
For use with Weber Joints

SF-6 Arc Weld Bond
For attaching to rail base

Making Tracks "Jointless" with G-E Welded Bonds

Welding a bond to a rail today need not be the troublesome task of fusing copper with steel. G-E Rail Bonds have steel faces expertly arc welded in the factory to drop forged copper terminals. Thus a track welder merely makes the perfect steel weld he is used to, and the bond becomes an integral part of the track.

G-E Welded Rail Bonds, either U-shaped for rail heads or of the flexible, long type for spanning splice bars are the outgrowth of broadest experience in railway work. They can be supplied in forms to satisfy any need.

General Electric Company

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Schenectady, N.Y.

Sales Offices in
all large cities

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Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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Volume 58 New York, Saturday, September 3, 1921 *Number* 10

Can Injunctions Alone Crush Competition?

A VISITOR to a neighboring jitney-infested city can study an entirely new aspect of the car versus jitney bus problem. One of the dizzily numerous ordinances, commission orders, injunctions, etc., apparently forbids the jitney buses from making a direct collection of fare from the passenger. But has this phased (or is it fazed?) the busmen any? Apparently not. Booths and salesrooms in stores have been established at convenient places where for the modest fee of 25 cents one becomes a full member of the Lively City Bus Association. Full membership covers the right to buy strip tickets at 5 cents per ticket, which is legal tender for fare. But the process may be short-circuited in this way: If the guileless stranger on offering cash is spurned by the law-observing driver, there is nothing to prevent one of the club members in the bus from courteously offering to sell a ticket to the outsider and thus preserve the driver from the temptation of accepting cash.

"What a farce," many a reader will say, and rightly. But, surely, a little reflection will show that the farce would be short-lived if there were not in the community a sufficient number of people determined to patronize the jitney bus service at all hazards. It is possible for the courts to issue all sorts of injunctions, but the long drawn out struggle with jitneys even in Seattle, where the street railway is clearly not being run for profit, proves that the self-propelled vehicle must have certain intrinsic advantages which appeal so much to the public that it will not willingly relinquish this form of transportation despite the shabby shape in which it has usually appeared to date. Should the day come when the motor buses are maintained at street railway standards by reliable operators many of the present objections urged will lose caste with that influential part of the public that today will not ride in the disreputable looking jitney at any price. Consequently, it seems worth while to reiterate the advice that the electric railway in making the motor-bus a part of its transport system must go the jitney busmen one better by using vehicles and giving service that will be so obviously superior to the privateering sort that the public will no longer go out of its way to help in the circumvention of orders of regulatory bodies.

N. E. L. A. Is Using the Movies

LAST year, in the issue of Sept. 25, the ELECTRIC RAILWAY JOURNAL suggested to the electric railways that they take advantage of the extraordinary educational power of motion pictures as a means of furthering the effort to win public understanding and good will. It was also suggested that the national association of the industry could well undertake the preparation of a film for the broad use of the member companies. Following this original suggestion, a great deal of other matter was published on the same subject, giving the views of a number of railway men on the high worth of the idea in general and on the details of its execution. There seemed to be a great deal of interest in the proposal.

Since then several companies have had a film made as an individual proposition, but for various reasons the American Association has been unable to undertake this new phase of publicity work in a definite way. Meantime, the National Electric Light Association has taken up this method of expanding its publicity work and has completed a very interesting short film, which was first shown at the June convention in Chicago and is now being distributed to the central station companies for general use. It is certainly to be hoped that this very effective means of reaching the public will receive full consideration in connection with the contemplated publicity campaign of the Committee of One Hundred.

Creditor Asks for Receivership for I. R. T.

THE application of a creditor of the Interborough Rapid Transit Company for the appointment of a receiver for that company was not unexpected. For the past two years the officers of the company have frankly declared that an increase in revenue per passenger was necessary for the solvency of the company. The immediate cause for financial embarrassment is the fact that the company has $38,000,000 of notes coming due Sept. 1. If these should be extended by the holders it may be that with the falling prices of materials, lower wages, and possibly other future savings, together with possible future relief to be granted by the New York Transit Commission, a receivership can be avoided. During the next few weeks, possibly the next few days, the matter will be decided, as Judge Mayer, before whom the proceedings have been brought, has asked the company to show cause on Sept. 1 why a receiver should not be appointed.

In the meantime, a variety of explanations have been put forth from different sources both as regards the reasons for the application for a receiver and those which have brought about the present unfortunate financial condition of the company, which four years ago was paying dividends of 20 per cent annually, and which as late as 1918 distributed 17½ per cent in dividends to its stockholders. Certain prominent city officials see in the application "another attempt through the federal courts to raise carfares in this city to 8 and possibly 10 cents." A candidate for Mayor who is strongly demanding the retention of a 5-cent fare declares a receivership unnecessary if the property should be operated by a man of the type of Mr. Mitten of Philadelphia, while a New Jersey financial company which has had previous litigation with the Interborough considers the actual deficiency much more than that set forth in the annual reports. No official statement had been made by the company or by the Transit Commission up to Aug. 31, except that Mr. McAneny, chairman of the commission, said its plans for reorganization of the transportation situation in New York would not be affected to any appreciable extent whether the company remained under the control of its corporate officers or was taken over by a receiver. In an interesting address delivered Aug. 30 in Cincinnati, however, Mr. Harkness, a member of the commission, in discussing transit tendencies in New York, outlined as some of the causes for the present situation the drifting policy adopted by the local authorities in regard to the question of fare and the attitude of the company with its present franchise of "demanding something and conceding nothing."

Whether the application for a receiver will be granted or not, the situation undoubtedly now has been brought to a crisis. An important and fortunate feature in the case is the legislation last spring by which far-reaching authority to grant transit relief was given to a commission, which has since been appointed. While no report has yet been made by the commission, its members in the past have a high reputation for good judgment, and it is to be hoped they will find a solution for the exceedingly tangled transit situation in New York.

It is certainly anomalous that an enterprise should experience a growing loss with an increasing gross business, yet should apparently be so helpless to make a change. It is also anomalous that in a city covering so large an area and so dependent for its prosperity upon good transportation as New York practically every local railway company is in financial straits, with none in notably prosperous condition.

Passengers per Car-Mile Not a Sure Service Index

THE expression "revenue passengers per car-mile" or "total passengers per car-mile," while the most convenient single term available as an index of traffic is likely to be most misleading if taken at its face value, especially if comparison is being made between different railways and even successive operating periods of the same railway. The less-used figure of "seats per passenger carried" is also subject to the same danger of misinterpretation. To prove this statement, a few illustrations will be presented.

First, assume that a comparison is made that Road A averaged nine passengers per car-mile in 1920 and that Road B averaged but six passengers per car-mile. It does not follow at all that Road A had more crowded cars. It may have been operating forty-eight-seat cars at five-minute intervals, while Road B may have been running thirty-two-seat cars at two and one-half or three-minute intervals. Thus Road B may prove to have carried the greater number of people if the comparison is made on the basis of "passengers per mile of route operated."

Second, density of traffic and standard of service are entirely different things, but confused if regard is taken only of the "passengers per car-mile" statistics. Suppose that through the inauguration of off-peak fares, short-ride fares, unlimited-ride passes or other means, there occurs a heavy increase in non-rush hour travel. This would be reflected by an increase in the unit of comparison "passengers per car-mile"—by, say, 20 per cent; but it would be wrong to suppose that there had been any lowering of the standard of service. The reason for this conclusion is the fact that practically every electric railway averages one and one-half to two seats per passenger carried when taken on its all-day operating basis, whereas it may not do better than 0.75 seat per passenger carried during the rush hours. Any increased travel during the off-peak hours therefore comes at a time when there are more seats than passengers. Hence, an increase in the average or all-time "passengers per car-mile" figures does not mean that the public is getting less service than before. In cases of this kind it means just the opposite, namely, that the public is making better use of the railway's facilities than before. Contrariwise, an increase in seats or car-miles per passenger carried might be coincident with poorer service, as when a severe fare increase cuts traffic 20 per cent while the daily car mileage is cut but say 10 per cent.

Perhaps the most conspicuous recent example of this is in the 5-cent suburban rides of the Boston Elevated Railway. Most of this short-haul travel flows counter to the heavier long-haul tidal traffic carried at 10 cents. It is conceivable that one, two, three or more passengers per car-mile could be added to the figures of straight 10-cent travel, and yet the 10-cent riders would have practically as much accommodation as before. That is why an 80 per cent increase in the local, short-haul traffic of the Everett-Malden district can be absorbed so readily. An example on a smaller scale is that of Racine, Wis., where the users of the unlimited-ride dollar-a-week passes are found to average nearly four rides a business day. This means, of course, that one pair of rides is taken during the off-peak hours, thus raising the density of traffic without lowering the standard of service or adding unprofitable mileage.

In between Boston and Racine, there is San Diego's zone fare. The fact that the first quarter of 1921 shows a 14 per cent increase in the 5-cent or short-haul riders over the first three months of the zone fare (January-March, 1920) indicates that the retention of this rate for more than one-third of the patrons has a tendency to stimulate short rides during the off-peak hours. Most of these additional short rides would not come unless the service was good, because this class of traffic will walk if headway and seating are unsatisfactory. A 10½ per cent increase in the sale of two-zone 7½-cent tickets at San Diego also indicates that the plan of selling four tickets at a time, as against 10 cents cash, induces a growing proportion of the two-zone riders to take luncheon rides if they are not too far away from their work, or else to be more liberal in other non-compulsory riding. At any rate, the fact that San Diego for this first quarter of 1921 shows about 24 per cent increase in passengers per car-mile and 1.43 as against 1.94 seats per passenger in the same quarter of 1920 is far more likely to be proof of the better use of the plant for the permanent good of the customer than proof of an arbitrary cut in service for the temporary good of the company. In this case, both patron and operator benefit, whereas an inexperienced reading of the "passenger per car-mile" and "seat per passenger" figures would lead to caviling rather than praise of the managements involved.

Utah Light & Traction Optimistic

Wartime Conditions Are Improved and the Labor Situation Is Satisfactory—The Public Co-operates to Remove Paving Burden—Unique Publicity Methods Are Employed in Utah—The Company Has a Splendid Carhouse and Self-Contained Repair Department

CARHOUSE OF UTAH LIGHT & TRACTION COMPANY

THE Utah Light & Traction Company operates in Salt Lake City under a franchise which expires in 1955. In keeping with its environment, the company is optimistic and is devoting its efforts toward a speedy consummation of its financial and transportation ideals. Like the story of other railway properties, the war brought on a series of wage increases, followed by fare increases, until the present schedule of a 7-cent cash fare or sixteen tickets for a dollar was instituted. The peak of the financial difficulties seems to have been reached in that a wage reduction has been agreed upon recently. The money thus saved has been utilized to care for deferred track maintenance.

Salt Lake City has a population of about 120,000 and is a miracle city when its history and location are considered. The optimism and hard work of the pioneers have transformed a desert into a rich agricultural district, with the city as its metropolis. Today the parks, broad streets and imposing business blocks of Salt Lake City compare favorably with those of any other American city. The railway's property in the city was completely rehabilitated during 1907, 1908 and 1909 by the Harriman interests, so that now it is modern in every respect. The company's tracks thoroughly cover the city and extend into all the important suburbs and suburban towns, serving a population of approximately 141,000 people with a mileage of single track of 146 and total passengers carried during the year 1920 of 40,500,000,

The Utah Power & Light Company owns the $1,000,000 capital stock (entire issue) of the Utah Light & Traction Company and leases and operates for ninety-nine years from Jan. 1, 1915, all the electric power, light and gas properties of the Utah Light & Traction Company.

Some of the power properties owned by the Utah Light & Traction Company and now operated by the Utah Power & Light Company are:

Pioneer hydroplant	6,500 kw.
Weber hydroplant	2,500 kw.
Granite hydroplant	1,500 kw.
Stairs hydroplant	1,800 kw.
Jordan steam plant	16,000 kw.

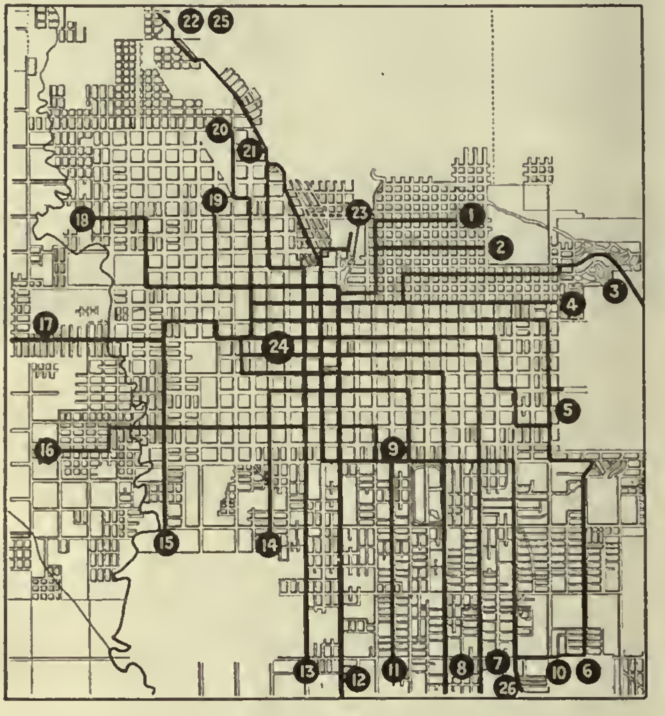
The railway company has car tracks on 66 miles of 72 total miles of paved streets in Salt Lake City. These paved streets are from 72 to 132 ft. wide and the company has been required to pave and maintain a street width of 21 ft. 8 in. on all its double-track installations. This paving investment requires about ¾ cent per revenue passenger to care for interest, depreciation and maintenance and places a heavy financial burden on the railway. Prospects are encouraging for legislative relief, but in the meantime the railway is using every possible expedient to extend service without increasing the investment in paved streets.

A beginning was made in 1920 to establish elevated center parkways, 44 ft. wide and 6 in. high, on certain of the streets to carry the double tracks of the railway. This parkway has a 6-in. curb and is grass covered excepting at street intersections. Due to the dry climate irrigation is necessary to maintain the grass and an underground pipe is placed in the parkways to afford water, furnished by the city, from sprinklers arranged at convenient intervals. The artistic effect of the installation is very good and the reaction on public sentiment has been splendid. It affords, in effect, a private right-of-way to the railway, reduces accidents, permits cheaper construction in that standard 72-lb. rails are used, reduces maintenance and at the same time is acceptable to the public since the street is 72 ft. wide and ample space remains for other traffic.

Another installation utilizes the fact that one of the city parks parallels the street for quite a distance. The company has installed its tracks in the park on a grass parkway near the street in such a manner as to give it the equivalent of a private right-of-way without detracting from the beauty of the park. The results of these methods of installation are encouraging and combined with the favorable legislative attitude and the good will of the public will probably result in the ultimate solution of the paving situation.

ROUTES AND SCHEDULES

The city has a level downtown district and an outlying hilly district with heavy grades. It is unique in that the city blocks are 10-acre plots as adopted by the early Mormon settlers and measure 792 ft. from street center to street center. The railway feeders are placed underground in the business districts and the trolley support is of span construction using steel poles with ornamental cast-iron bases. The transportation system is based on twenty-six routes each of which traverses both the level downtown section and the heavy grades of the Wasatch foothills. Each of the 172 passenger cars displays its route number on its dash and a complete schedule and map of the route is published and distributed by the railway. This little publication is in the form of a pamphlet about 5 in. long by 3 in. wide containing forty pages of material.



MAP OF SALT LAKE CITY SHOWING STREET CAR ROUTES

Key numbers show patrons the route to take to a desired destination.

This booklet describes the routes by streets, and indicates the scheduled leaving time of cars from the end of the line and the time cars leave downtown. It contains also sectional plats of Salt Lake City with each of the routes indicated thereon. The routes are numbered from 1 to 26 inclusive and the booklet is so arranged that the route number covering any portion of the city may readily be obtained by turning to the large scale city plat in the center of the booklet. After the reader finds the route number from this complete plat, it is easy from page 1, which carries an index of all routes, to find the pages which give a sectional plat to large scale accompanied by a description of where any particular route starts and finishes, including a complete time schedule for inbound and outbound cars at several locations. The booklet also takes advantage of Salt Lake City's attractions to point out different points of interest to tourists with directions for reaching them.

Salt Lake City, due to its wide streets, permits good schedules and offers but little opportunity for traffic congestion. On several of the main intersections in the towntown districts a traffic officer is stationed in a tower near the curb and controls the traffic by means of a four-way red and white signal lamp suspended at the center of the street intersection. In this district safety aisles are maintained by the use of portable pedestals connected by chains. Iron pipe is cast in cone-shaped concrete bases and several such pedestals are connected together depending upon the traffic demands.

The cars are very attractive modern type of pay-as-you-enter design and operate with fare boxes. They are painted a buff and yellow and are washed frequently in order to maintain them in an attractive condition despite the action of smelter fumes or other detrimental atmospheric effects. No one-man cars are used in the city, as labor opposed their use during the war and financial conditions have been unfavorable since that time. Salt Lake City has no large manufacturing industry and has plenty of room to expand in all directions, so the railway company is not subjected to very great shifts in traffic or to industrial peak loads.

SPECIAL TRACKWORK AND EQUIPMENT

The company has discontinued the use of manganese inserts at intersections and instead uses bolted built-up special trackwork. The bolts are "drive fits" with the threaded ends of small diameter so as to avoid injury. The filler is planed down and a tapered steel insert 36 in. long is placed on top. These inserts are changed as they become worn, and this policy greatly aids in reducing the noise at crossovers.

Due to climatic and soil conditions and to questions of maintenance, the company has shown a marked tendency toward the location of all controls and apparatus in the car and not under it. The signal batteries are located over the entrance doors with a consequent great reduction in maintenance, and even the headlight resistances have been maintained at zero cost since they were located on the ceiling of the vestibule. To avoid breakage and obtain low maintenance cost, many of the headlights on the interurban cars have been placed on top of the car, just over the front window instead of on the dash. These headlights are arranged so as to burn 250-watt Mazda lamps with adjustments for a fixed beam angle and intensity. The air governor has also been located above the doors in the vestibule, and in this location operates much more satisfactorily. The location of the air valve, door lever, gong, stool sockets and other controls has been determined by a vote of the employees and is standard for all cars. An improvised "buggy top" door mechanism is used on the changed over pay-as-you-enter cars, whereby one-eighth turn of a 10-in. lever opens or closes the vestibule doors.

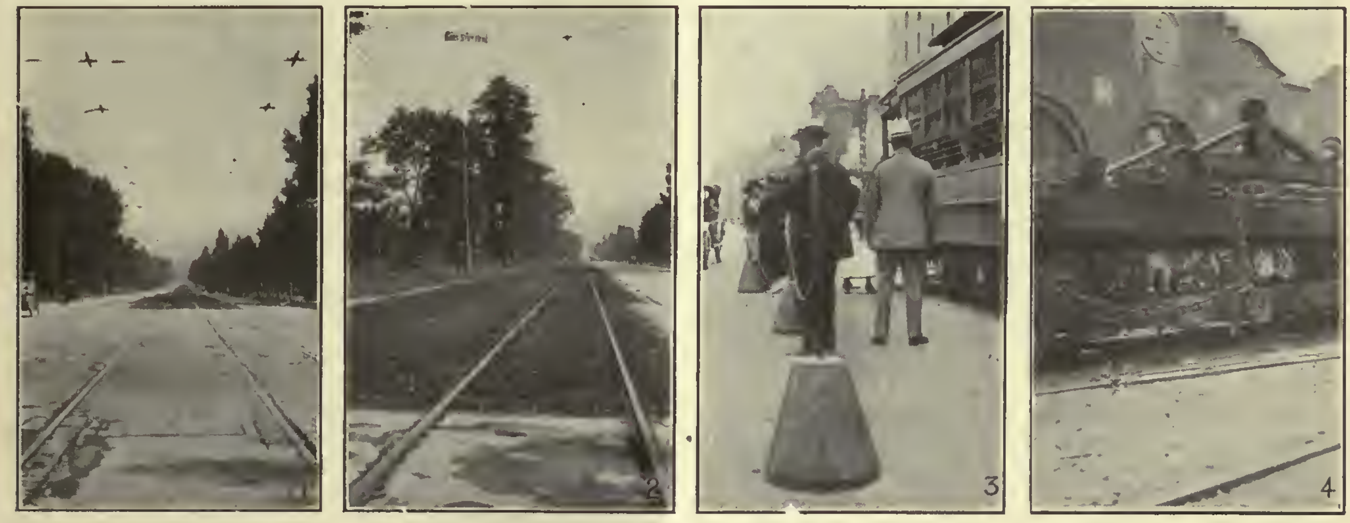
A unique type of work car has been made which can be used as a reel car, track harrow or both. Near smelters and where slag gets on the tracks this car is used as a harrow to loosen the lava roadbeds. The harrow proper consists of an old crossover hung on a windlass operated chain under the center of the car.

In this framework are fixed thirteen pointed steel teeth each of which is 2 in. square and about 18 in. long. When needed, the crossover with the teeth inserts is dropped on the track and dragged along the ground between and outside the rails to break up the slag. The device has proved very efficient for certain conditions.

The company has developed many ingenious ways of using scrap pieces of equipment, such as steel and old rail. A very convenient light crane car has been constructed almost entirely from old 72-lb. rails. The sills of the car and the crane proper form a very rigid built-up structure which has proved very useful on the system.

CARHOUSES AND SHOPS

The carhouses, shops and yards of the railway company are located about six blocks from the center of the downtown district. These buildings occupy an entire block 680 ft. square. The carhouse proper is about 430 ft. x 230 ft. and is equipped with several tracks which have a 1 per cent slope toward the rear. The carhouses, shops and store buildings are well designed mission type structures of red brick, steel and concrete.



FAST SCHEDULES AIDED BY GOOD TRACK LOCATIONS

No. 1—Double-track construction in elevated center parkway.
No. 2—Double-track construction in park adjacent to a street.
No. 3—A flexible safety aisle in a congested district.
No. 4—Reel car used to support a unique track harrow.

The front is arranged in a series of arches, each of which spans two tracks in the carhouse. In the end wall of each bay over the supporting pier is the monogram of the company with dimensions about 6 ft. square. Motor-operated rolling steel doors are fitted under each arch. The roof has over 200 skylights in it, each of which is about 8 ft. x 16 ft. In the carhouse the tracks are on concrete pit walls for a length of about 200 ft., the pit floors having a 1 per cent grade. These pits are placed under each track with shallow pits on either side. These shallow pits collect the snow or water that drops from the sides of the car when in storage after a trip, permit easier journal inspection and facilitate car washing. Each pit is lighted by lamps which are about 10 ft. apart on either side of the pit wall. Over each track a trolley trough has been made of 4-in., 5½-lb. channel iron with edges turned down. These channels are electrically bonded and insulated from the steel roof trusses by means of wooden blocks. The advantage of the channel type of overhead construction lies in the fact that it permits rapid movement of a car forward or backward without changing the trolley, which in this carhouse would cause delay due to the presence of a sprinkler system. Any tendency for slack in overhead conductors is also eliminated and an exceptional method of isolation is conveniently obtained with a switch and circuit breaker for each section.

The carhouse is equipped with a two-deck International sprinkler system. This sprinkler system is universal throughout the structures and is controlled from several locations by electrically operated push-buttons. A water storage tank for reserve is located on the block.

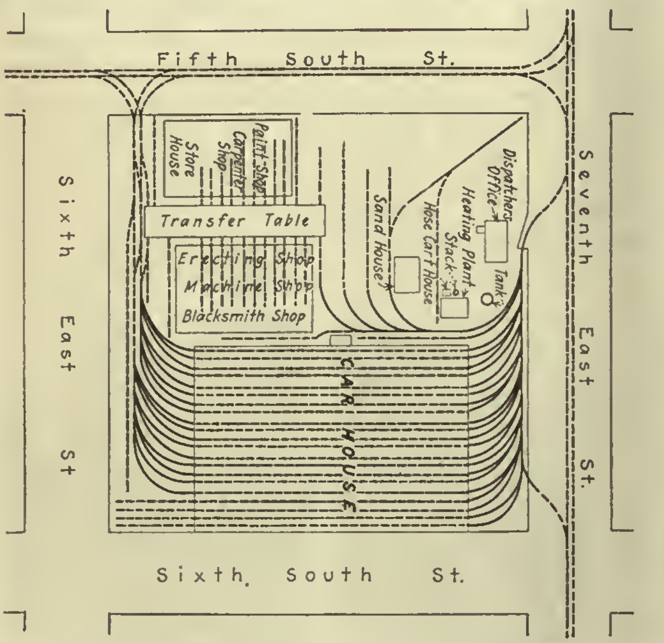
The shops, offices and storerooms are well lighted and conveniently arranged. The storeroom has a main floor, balcony and basement and is protected from fire by a complete sprinkler system. Especially constructed rooms are used in the basement for the storage of oil and paint, while spare parts and smaller stores are kept in indexed steel bins or trays on the main floor. The company carries a large stock of material and stores due to its distance from railway supply manufacturers.

The carpenter and slight repair shop has five tracks, each of one-car capacity, and is well equipped with small tools and benches. For the repair of the outside veneered car side panels 20-gage sheet iron is now used instead of wood veneer, which depreciated rapidly because of local service conditions. Great care is taken to install this sheet-iron veneer so as to avoid the entrance of any moisture, and the experience with this type of construction has been very satisfactory.

The paint shop has four tracks each with a capacity of two cars. On an average of once in three years each car receives one coat of a special enamel paint on the main body and about every eighteen months a coat of varnish is used on the other parts. The enamel paint which is used has been selected after a great deal of experience with several types of paints and enamels and has given remarkable satisfaction. Two painters and one helper care for all the work in the paint shop. A balcony in the paint shop is used to eliminate dust and dirt when painting or varnishing seats, sashes, or other small parts.

The sandhouse is equipped to use either wet or dry sand and contains stoves, elevators, screens and bins. The sand is sacked from the bins and then the sacks are located in a sand car which is spotted near the incoming cartracks. Each returning crew upon reaching the sand car places its quota of sand in the car before checking in. This arrangement has proved superior to other methods.

The main repair shop is equipped with forging machines, 1,100-lb. air hammer, a punching machine, drill presses, an acetylene outfit, a complete rail bending and cutting outfit, and other standard equipment. Due to its location, the company is forced to be practically self-contained with respect to its repairs and has developed a very good repair shop and some ingenious and unique "shop kinks" from its experiences. It has recently reground all the cylinders of the car compressors and put in slightly larger pistons with splendid success.



PLAT SHOWING LAYOUT OF SHOPS AND CARHOUSES

A rather unique operation performed by the company was the use of old rolled-steel wheels and axles for making brake hangers. The scrap material was cut into suitable length with the acetylene torch and then drawn into 1½-in. round bars. The bars were then forged in an Ajax forging machine to a ball on each end, after which the balls were flattened by the hammer and punched to fit the brake-head cone.

This method was used when steel was expensive and hangers produced were excellent, but the present practice is to use 1½-in. round mild steel in connection with a 1½-in. Ajax forging machine and a 1,100-lb. steam hammer. The hangers are all case hardened after forming. Two hangers are used on each brake beam and about 1,200 are in service. The renewals amount to about 200 per year on the cars, which are mostly four-motor types weighing from 40,000 to 56,000 lb.

Steel scrap wheels are formed by the splendid shop equipment into the following tools: Open-end and socket wrenches; anvil tools and tongs; air hammer swages and formers; forging-machine dies; asphalt-cutting chisels and stone-masons' hammers.

Seven of the pits in the repair shops are equipped with car hoists, which greatly facilitate repair operations. The street brooms are subjected to a thorough soaking in a special pit before being placed in operation, as this process results in a large saving due to the decreased brittleness of the brushes. The transfer table has been equipped with snowplows with resultant decreased trouble from snow in winter operation. Previous to the installation of these plows on the table much delay was caused by the transfer table pit filling with snow. For snow-fighting work and for hauling gravel and other construction materials, the company has three locomotives, one switch locomotive and fifty work cars.

PUBLIC POLICY AND PUBLICITY

The railway management realizes that public relations comprise a large percentage of railway operating success, and this company, under the able direction of H. W. Dicke, general manager, has secured the co-operation and good will of the public to a remarkable extent. One of the chief instruments for informing the public of railway conditions is a publication called *Car Fax*, which is freely distributed on all cars at frequent intervals. The public is informed of the plans of the company and is made aware of all railway conditions through this publication. A case in point is that preliminary to the recent wage reduction *Car Fax* informed the public that the money saved would go toward deferred track maintenance, and when the reduction was obtained this announcement was immediately followed up by the appearance of repair gangs on the main streets. Letters from the public commending or criticising the service or the personnel of the organization are printed in this little pamphlet and it serves to bind the personnel of the railway organization together and inspire them to greater efforts in the line of securing public good will.

As an example of the type of material published in *Car Fax*, the issue of July 23, 1921, gives a complete résumé of the financial condition as affected by the 7-cent fare and ventures to prophesy the future under that fare. The issue starts out with the headline "What the 7-Cent Fare Has Done." "On July 3, 1920, the present rate of fare (7 cents cash, 6¼-cent ticket in books of sixteen for $1, and the 4-cent school ticket in books of fifty for $2) became effective. With the close of the month of June, 1921, therefore, we have the results of operation for one year on the so-called 7-cent fare, and *Car Fax* is sure that its readers are curious to know just how much 'profits' the Utah Light & Traction Company has made and is making on the 7-cent fare."

The paper goes on to state that the company has always held to the policy that the patrons were entitled to know everything, and that if they did, the company as well as its patrons would fare better than they would if each were suspicious and distrustful of the other. During the past twelve months a total of 38,737,540 passengers were carried, and the total amount of money collected was $2,142,481.79, or an average of 5.53 cents from each passenger. The exact number of each class of passengers carried, together with the revenue re-

TABLE I—STATISTICS FOR ONE YEAR WITH THE 7-CENT FARE AS PUBLISHED IN *CAR FAX*

Operating Revenue:			
Cash-fare passengers.....	16,052,259 @ 7c.	$1,123,658.13	
[1]Adult-ticket passengers..	14,749,896 @ 6¼	921,868.50	
Adult-ticket passengers...	890,204 @ 5c	44,510.20	
School-ticket passengers..	1,197,643 @ 4c	47,905 72	
[1]School-ticket passengers.	151,308 @ 3c	4,539.24	
Transfer passengers......	5,569,953 no charge		
Express, mail and miscellaneous revenue.....		20,513.95	
Total..			$2,162,995.74

[1] The 5-cent adult tickets and the 3-cent school tickets shown above were in the hands of the public on July 3, 1920, and according to the Public Utility Commission's order the company was obliged to honor them up to July 31, 1920.

ceived therefrom, as well as from the carrying of express, mail, etc., is given in the printed statement.

The company's costs for operating this property during the past year were as follows:

Operating Expenses:		
Repairs and upkeep of track and pavement...	$166,327.56	
Repairs and upkeep of cars....................	136,553.35	
Power to operate, heat and light cars.........	235,501.91	
Wages of conductors and motormen..........	747,628.16	
General and miscellaneous expenses (including accidents)..................................	206,770.33	
Taxes and licenses............................	123,000.00	
[2]Depreciation reserve.......................	144,725.00	
Total operating costs........................		$1,760,506 31
Net operating revenue........................		$402,489 43
Property investment..........................		$8,669,695 13
Rate of return upon the investment.....($402,489.43 :-: $8,669,695.13)—4 64%		

[2] The amount of depreciation reserve was fixed by the Public Utility Commission.

The figures used as the property investment is the value placed upon this property for rate-making purposes by the Public Utility Commission as of June 30, 1918, plus additions to property from that date to December 31, 1920.

The net operating revenue of $402,489.43 for the past year represents an annual return of 4.64 per cent upon the investment in the property, or just about enough to meet the interest at 5 per cent on the money borrowed (through the sale of mortgage bonds) on the property. *Car Fax* goes on to state that no dividends have been paid by the Utah Light & Traction Company for five and one-half years, and that profits are absolutely unknown. In fact, states the paper, "There can be no profits under governmental regulation of public utilities." All that the owners of public utility securities can hope for is a fair return in the nature of interest upon their holdings.

In predicting results of operation during the coming year under the existing conditions, *Car Fax* states that it will not venture to hope for a reduction in carfare because the company will have to spend considerably more money for repairs to track, pavement and cars than it has been spending during the past few years. The paper then goes on to state that with a return of only 4.46 per cent upon the investment in the property as compared with obtainable returns of better than 6 per cent upon U. S. Liberty bonds and from 8 to 10 per cent upon investments in reputable businesses, the public can readily understand why the railways are hard up. The company is optimistic, however, and hopes that with the decreasing costs for materials and wages, the time will come when the property will be prosperous and it will be able to expand and extend its lines into every section of the community. It points out that the street railway is a necessity to any community, and that it will greatly aid in the growth and development of any community. *Car Fax* concludes by stating that the company appreciates the confidence of the people and wants to reciprocate by placing all of its cards on the table face up.

TABLE II—UTAH LIGHT & TRACTION—OPERATING STATISTICS FOR LAST FOUR YEARS

	1917	1918	1919	1920
Gross earnings..........	$1,597,315	$1,602,000	$1,855,281	$2,069,482
Operating expenses and taxes.................	1,133,307	1,142,893	1,245,752	1,489,283
Depreciation............	30,000	25,000	150,000	144,725
Operating ratio..........	0.73	0.73	0.75	0.79
Car-miles...............	5,627,762	5,466,576	5,303,783	5,316,913
Car-hours................	566,086	544,084	525,216	528,022
Number of cars	86	83	80	80
Total passengers........	40,320,109	36,174,985	39,521,505	40,512,223
Passengers per car-mile...	7.1	6.6	7.4	7.6
Passengers per car-hour...	71	66.4	75.3	76.8
Car-miles per car-hour....	9.9	10.0	10.1	10.0
Earnings per car-mile....	$0.28	$0.29	$0.35	$0.39
Earnings per car-hour....	$2.82	$2.95	$3.54	$3 09
Expenses per car-mile....	$0.20	$0 21	$0.26	$0.32
Expenses per car-hour....	$2.03	$2.14	$2.66	$3.10

Jitneys cause no trouble in Salt Lake City, because regulatory legislation was passed before they obtained a foothold. Power is purchased from the Utah Power & Light Company under very favorable rate schedules, since it is largely hydro-electric. Thus, the railway company has been spared two of the trials encountered by many other operators—the coal shortage and the jitneys.

CONCLUSION

The Utah Light & Traction Company is a splendid example of Western traction and illustrates by its prosperous condition, optimistic attitude and ingenious installations the results that ability can accomplish with a railway property under severe handicaps inherent in an agricultural community very distant from industrial centers. It is unique in that it operates in a city and district where conditions are such as to give a very static daily and yearly passenger traffic free from fluctuations due to industrial or climatic changes.

VIEW OF MAIN STREET, SALT LAKE CITY

Extensive Electrification Plans

World's Survey Shows that Many Countries Are Preparing to Substitute Electricity for Steam—The Present Shortage of Coal Is an Important Factor

THE *Electric Railway & Tramway Journal* for July 8 is a "Special World Issue" and contains data in regard to proposed electrifications in many countries. The following is a summary of the more important data given:

SOUTH AMERICA AND WEST INDIES

In the Argentine the electrification of the suburban lines of the Buenos Aires Western Railway is making progress. The entrance to Buenos Aires is over the city lines of the Anglo-Argentine Tramway Company. Other railway electrification is in contemplation.

In Bolivia electric power will be used on a trans-Andine line from Las Paz to Yungas now under construction. Electricity was selected because of the high price of coal and the presence of large water-power resources along the route. There is at present a 56-

mile electric railway in the eastern part of the republic.

Considerable additional electrification is proposed in Brazil, following the completion of a section of the Paulista Railway, already described in this paper.

In Chile tenders have been invited for the electrification of the Valparaiso-Santiago and the Santiago-Talca lines, and the electrical equipment of a 20-mile section of the Nitrate Railways is being seriously considered.

A report has been made to the government of Jamaica of the cost of electrifying its railway system of 197 miles. The expense is estimated at £1,257,000 and the proposal is urged by commercial interests in Jamaica.

EUROPE

Austria is intending to equip 652 km. of railway route, the work to be completed by June 30, 1925. Of this length 412 km. are single-track lines and 240 km. are double-track lines. Hydro-electric power will be used.

As a result of a trip of inspection, a commission of the Belgian State Railways has recommended the adoption on that system of 1,500-volt direct current with third rail.

It has been estimated by the three principal railway companies in France that the electrification of 8,800 km. of their lines will effect an annual economy of 1,500,000 tons of coal (based on the traffic of 1913). An official commission to study the relative advantages of the different systems has made a tour of the United States and other countries, and has recommended high-tension direct current.

In Great Britain it is believed that nothing further is likely to be done until the railways return to private control and the electrification of railways advisory committee has presented its report. This committee has now been sitting more than twelve months. An interim report in July recommended standardization of both methods and appliances. A few of the lines are making extensions of their electrical divisions.

Italy has extensive electrification plans because of the high cost of coal and the large amount of water power available in the Alps and Apennines. At present the three-phase system of working predominates, this being used on 390 km. of route and 650 km. of track, but there is some trackage equipped with direct current, including a high-voltage direct-current railway between Turin and Lanzo. The railway administration proposes a program of future electrification covering 2,000 km., the total length of the state railway system being 14,000 km. It is expected that this equipment would effect an economy of about 500,000 tons of coal. Active work has been begun on a 2,400-volt line from Rome to Port of New Ostia, a distance of 25 km. Both electric locomotives and motor car trains will be used, and it is hoped the line will be in operation by 1922.

The mountain division of the North of Spain Railway (42 km. in length) is being electrified, and several other projects will probably be taken up soon.

In Sweden the hydro-electric department has asked the government to include estimates of 51,050,000 kroner in the budget of 1921 for the extension of hydro-electric works, some of which are intended for use in connection with a supply of power to the proposed Stockholm-Gothenburg Railway, and the railway administration has asked for a vote of 26,000,000 kroner for 1922 in addition to the 23,000,000 kroner approved for 1921 for the execution of works for the conversion of the same railway. The cost of the complete electrification of the line is estimated at about 90,000,000 kroner.

The Swiss seem definitely to have adopted the single-phase system which is in use on the St. Gotthard line, the latest line to be equipped and the most important through-line between Switzerland and Italy. Generally 7,500 volts will be used on the trolley line during the period of operation by both steam and electricity, and 15,000 volts will be used when steam traction is suppressed.

A part of the proposed program of the Soviets in Russia, as is well known, is the construction of a super-power system and considerable railway electrification.

ASIA, AUSTRALIA AND AFRICA

The electrification program of the Japanese railways is reported to include from 500 to 700 miles during the next five years, starting with lines around Tokio. Work has also been begun on a tube line in that city.

The electrical equipment of some of the suburban divisions of the steam railroads entering Bombay, India, is being seriously considered.

The Ceylon government has ordered a detailed survey made of that island's hydro-electric resources with a view of possible electrification of some of the lines.

Melbourne, Australia, is completing its electrification of suburban lines which will involve sixteen substations, 145 miles of track, and 702 cars. Forty-four and a half miles are now in operation, and the last of the system as at present planned will be completed, it is thought, in February, 1923. The capital cost of the present scheme when completed will be approximately £5,000,000. Considerable suburban electrification will also probably be undertaken at Sydney, Australia.

The contract for the electrification of a mountain section of the Midland Railway of New Zealand has been placed with the English Electric Company. The section is a little more than 8 miles in length, of which 5 miles are in a tunnel.

The general manager and chief engineer of the hydro-electric department of the Tasmanian government, after an inspection of properties of this kind in the United States, Canada and Switzerland, recommends development of that country's hydro-electric resources. He reports 26,000 hp. is already being used, 70,000 hp. is being developed, and it is hoped eventually to develop 400,000 hp. Several electrifications are proposed.

Some work has already been done on developing hydro-electric power in Java, and it is expected that when a station in the residency of Batavia is finished, part of its current will be used in the operation of the Batavia Railway.

The South African Parliament has authorized the prompt electrification of two sections of government railways, and tenders have been called for from various countries. One section is for a suburban division with heavy passenger traffic extending out from Cape Town. The length of route is 22½ miles, of which 15½ miles is double track. Sixty-four motor cars and sixty trail cars would be required. The other division is a mountain section between Durban and Pietermaritzburg, a distance of 70 miles. The cost for the equipment of this line, including power stations, is £2,921,400.

Merchandising Transportation

In This Final Talk of the Series on the Merchandising of Transportation the Author Explains How Sales Can Be Increased Through the Good Will of the Public and How that Good Will May Be Cultivated

BY W.H. BOYCE
General Manager Beaver Valley Company, New Brighton, Pa.

FIFTH ANNUAL NEWSPAPER MEN'S DINNER. MR. BOYCE ENTERTAINS THE NEWSPAPER MEN IN THE VICINITY OF NEW BRIGHTON ONCE A YEAR AT DINNER. IN THIS GROUP HE WILL BE SEEN THE THIRD FROM THE LEFT OF THE MIDDLE ROW

THE most valuable asset a street railway can have on its books is the good will of the public.

Manufacturers rate the value of good will at millions of dollars, and good will is simply the result of the confidence which people in general have in the character of an organization.

To build up good will and extend your radius beyond your present circle is your responsibility. Advertising is one of the mediums that will carry the character of your railway organization to your public and help form opinion.

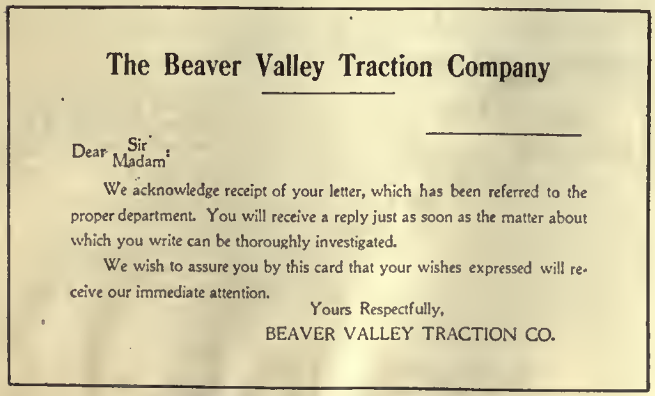
Public opinion is the greatest power in the world. Without properly formed public opinion a company is lost. Favorable public opinion can be cultivated for your property if you are alive to the fact that you are dealing with human beings.

Successful business men have long since demonstrated that success is achieved through the cultivation of elements of human interest in business. You like to trade at such places—places where there is a friendly desire to satisfy in every particular. We understand where this is the case that the heart is right, yet there may sometimes be financial reasons why in every particular satisfaction cannot be given. All electric railway companies have their financial troubles, yet all of us can do more to have our public understand these difficulties. In such cases advertise them through your employees (who should be put in possession of the facts) at your clubs, in the lodges, on the golf course, and through newspaper copy, circular letters and car cards.

Present conditions call for economy in operation. You may not be able to do all you want to reach your ideal, but for the salvation of your company do all that you can.

Traditional practice is not enough today. Times and conditions have changed. Some railway operators have not. Wake up! Eight million men have bought automobiles which are taking your traffic and at the same time increasing your operating expenses through increasing your operating difficulties and accident hazards.

Wake up. Leave the wake. Burn the crape. Put pep,



The Beaver Valley Traction Company

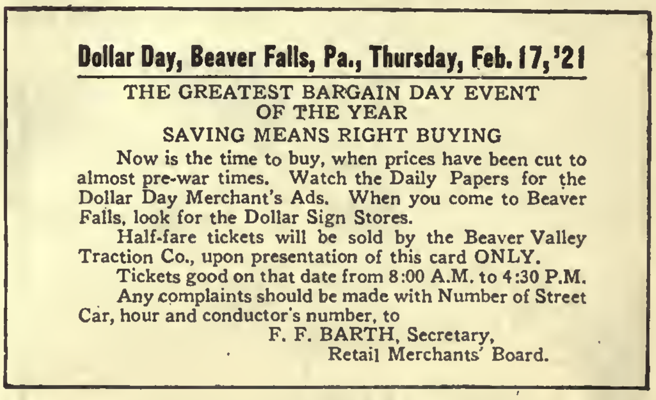
Dear Sir:
Madam:

We acknowledge receipt of your letter, which has been referred to the proper department. You will receive a reply just as soon as the matter about which you write can be thoroughly investigated.

We wish to assure you by this card that your wishes expressed will receive our immediate attention.

Yours Respectfully,
BEAVER VALLEY TRACTION CO.

CARD OF ACKNOWLEDGMENT SENT TO LETTERS OF COMPLAINT



Dollar Day, Beaver Falls, Pa., Thursday, Feb. 17, '21

THE GREATEST BARGAIN DAY EVENT
OF THE YEAR
SAVING MEANS RIGHT BUYING

Now is the time to buy, when prices have been cut to almost pre-war times. Watch the Daily Papers for the Dollar Day Merchant's Ads. When you come to Beaver Falls, look for the Dollar Sign Stores.

Half-fare tickets will be sold by the Beaver Valley Traction Co., upon presentation of this card ONLY.

Tickets good on that date from 8:00 A.M. to 4:30 P.M.

Any complaints should be made with Number of Street Car, hour and conductor's number, to
F. F. BARTH, Secretary,
Retail Merchants' Board.

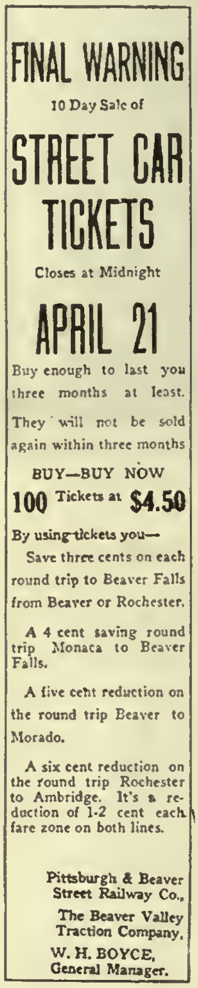
POSTAL CARD SENT OUT BY RETAIL MERCHANT BOARD, FEB. 17, 1921, EXPLAINING ABOUT REDUCED FARES new ideas and new thought into the merchandising of transportation.

Cultivate your public with the knowledge that "all eggs look alike but they 'ain't.'" You may be able to reach the auto-riding highbrow, but don't overlook all of your every day car riders. Many of them are influential office-holding persons. They are all public-opinion formers and car riders. If you can't speak their language, get some one who can. Your experience, integrity and good intentions alone are not enough. But when all of them are backed by continuous interest on the part of your employees and yourself—then a different story.

Don't forget that the heart must be right.

Your interest in all civic matters, the expenditure of your time, money and effort in local commercial or civic bodies, these are evidences of your good faith.

If you are too busy attending to details to undertake this work, why should I waste my time writing these articles and you waste yours reading them. True economy must prompt you to get proper and sufficient assistants to care for small matters.



FINAL WARNING

10 Day Sale of

STREET CAR TICKETS

Closes at Midnight

APRIL 21

Buy enough to last you three months at least. They will not be sold again within three months

BUY—BUY NOW

100 Tickets at $4.50

By using tickets you—

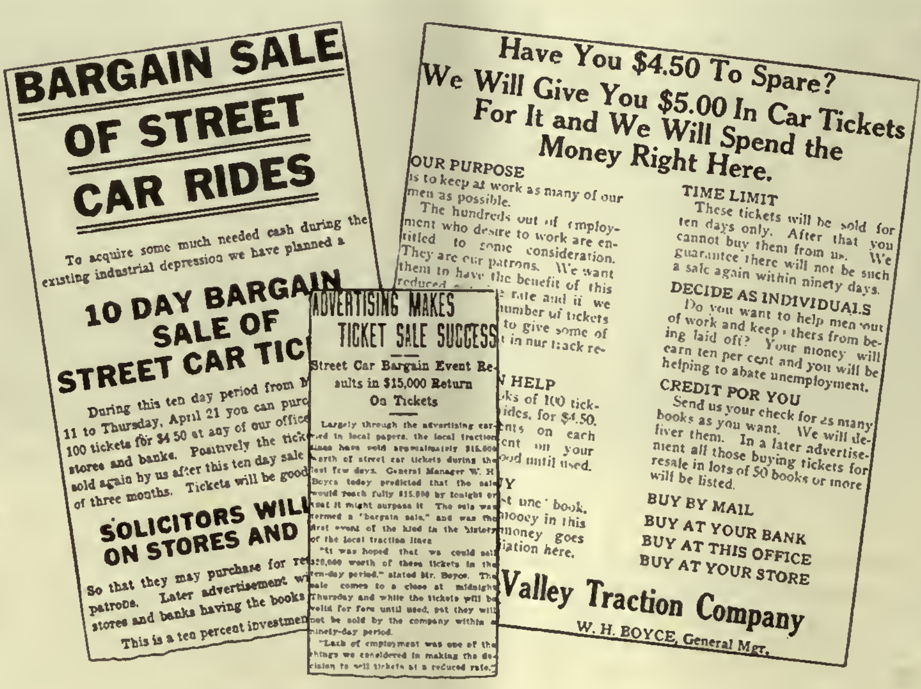
Save three cents on each round trip to Beaver Falls from Beaver or Rochester.

A 4 cent saving round trip Monaca to Beaver Falls.

A five cent reduction on the round trip Beaver to Morado.

A six cent reduction on the round trip Rochester to Ambridge. It's a reduction of 1-2 cent each fare zone on both lines.

Pittsburgh & Beaver Street Railway Co.,
The Beaver Valley Traction Company.
W. H. BOYCE,
General Manager.



BARGAIN SALE OF STREET CAR RIDES

To acquire some much needed cash during the existing industrial depression we have planned a

10 DAY BARGAIN SALE OF STREET CAR TIC

During this ten day period from M
11 to Thursday, April 21 you can purc
100 tickets for $4 50 at any of our office
stores and banks. Positively the tick
sold again by us after this ten day sale
of three months. Tickets will be good

SOLICITORS WILL
ON STORES AND

So that they may purchase for re
patrons. Later advertisement wi
stores and banks having the books

This is a ten percent investmen

ADVERTISING MAKES TICKET SALE SUCCESS

Street Car Bargain Event Results in $15,000 Return On Tickets

Largely through the advertising carried in local papers, the local traction lines have sold approximately $15,000 worth of street car tickets during the last few days. General Manager W. H. Boyce today predicted that the sale would reach fully $15,000 by tonight or that it might surpass it. The sale was termed a "bargain sale," and was the first event of the kind in the history of the local traction lines.

"It was hoped that we could sell $20,000 worth of these tickets in the ten-day period," stated Mr. Boyce. The sale comes to a close at midnight Thursday and while the tickets will be valid for fare until used, yet they will not be sold by the company within a ninety-day period.

"Lack of employment was one of the things we considered in making the decision to sell tickets at a reduced rate."

Have You $4.50 To Spare?
We Will Give You $5.00 In Car Tickets For It and We Will Spend the Money Right Here.

OUR PURPOSE
is to keep at work as many of our men as possible.

The hundreds out of employment who desire to work are entitled to some consideration. They are our patrons. We want them to have the benefit of this reduced ... rate and if we ... number of tickets ... to give some of ... in our track re-

... HELP
...ks of 100 tickets rides, for $4.50. ...nts on each ...cent on your ...ood until used.

...Y
...t one book. ...money in this ...money goes ...iation here.

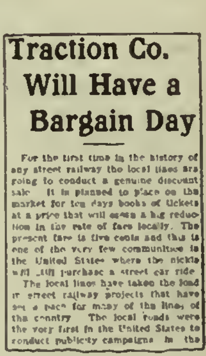
TIME LIMIT
These tickets will be sold for ten days only. After that you cannot buy them from us. We guarantee there will not be such a sale again within ninety days.

DECIDE AS INDIVIDUALS
Do you want to help men out of work and keep others from being laid off? Your money will earn ten per cent and you will be helping to abate unemployment.

CREDIT FOR YOU
Send us your check for as many books as you want. We will deliver them. In a later advertisement all those buying tickets for resale in lots of 50 books or more will be listed.

BUY BY MAIL
BUY AT YOUR BANK
BUY AT THIS OFFICE
BUY AT YOUR STORE

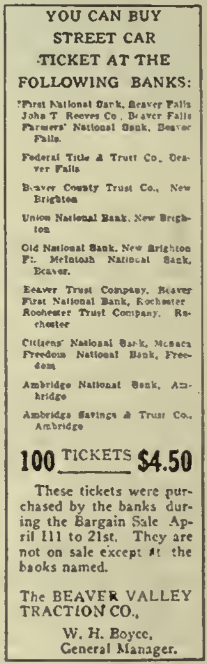
Valley Traction Company
W. H. BOYCE, General Mgr.



Traction Co. Will Have a Bargain Day

For the first time in the history of any street railway the local lines are going to conduct a genuine discount sale. It is planned to place on the market for ten days books of tickets at a price that will mean a big reduction in the rate of fare locally. The present fare is five cents and this is one of the very few communities in the United States where the nickle will still purchase a street car ride.

The local lines have taken the lead in street railway projects that have set a pace for many of the lines of the country. The local roads were the very first in the United States to conduct publicity campaigns in the



YOU CAN BUY STREET CAR TICKET AT THE FOLLOWING BANKS:

First National Bank, Beaver Falls
John T. Reeves Co., Beaver Falls
Farmers' National Bank, Beaver Falls.
Federal Title & Trust Co., Beaver Falls
Beaver County Trust Co., New Brighton
Union National Bank, New Brighton
Old National Bank, New Brighton
Ft. McIntosh National Bank, Beaver.
Beaver Trust Company, Beaver
First National Bank, Rochester
Rochester Trust Company, Rochester
Citizens' National Bank, Monaca
Freedom National Bank, Freedom
Ambridge National Bank, Ambridge
Ambridge Savings & Trust Co., Ambridge

100 TICKETS $4.50

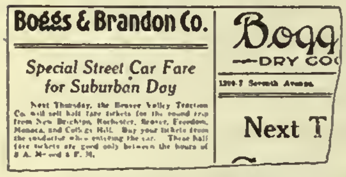
These tickets were purchased by the banks during the Bargain Sale April 111 to 21st. They are not on sale except at the banks named.

The BEAVER VALLEY TRACTION CO.,
W. H. Boyce,
General Manager.

Features of the Beaver Valley Traction Company Publicity

From April 11 to April 21, 1921, the company had a "bargain" sale of tickets, or a reduction of 10 per cent. These tickets were on sale at various banks, stores and factory offices and were good until used. This bargain sale was advertised as shown in the upper series of illustrations.

The lower series of illustrations show how the Beaver Valley Traction Company co-operated with the merchants of its localities by reducing its fares for special events such as "dollar" days, and the exhibition of Charlie Chaplin in "The Kid." The reproductions show how many of the merchants called attention in their newspaper advertisements to this fare reduction by the company.



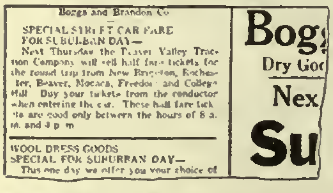
Boggs & Brandon Co.

Special Street Car Fare for Suburban Day

Next Thursday, the Beaver Valley Traction Co. will sell half fare tickets for the round trip from New Brighton, Rochester, Beaver, Freedom, Monaca, and College Hill. Buy your tickets from the conductor when entering the car. These half fare tickets are good only between the hours of 8 A. M. and 4 P. M.

Bogg
—DRY GOO
1200-2 Seventh Avenue

Next T

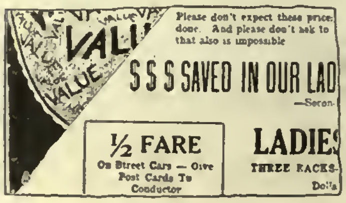


Boggs and Brandon Co

SPECIAL STREET CAR FARE FOR SUBURBAN DAY—
Next Thursday the Beaver Valley Traction Company will sell half fare tickets for the round trip from New Brighton, Rochester, Beaver, Monaca, Freedom and College Hill. Buy your tickets from the conductor when entering the car. These half fare tickets are good only between the hours of 8 a. m. and 4 p. m.

WOOL DRESS GOODS SPECIAL FOR SUBURBAN DAY—
This one day we offer you your choice of

Bogg
Dry Goo
Nex
Su



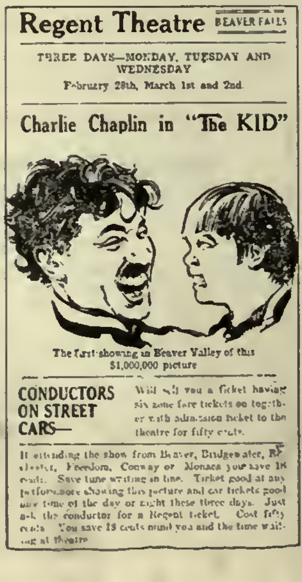
VALUE
VALUE
VALUE

Please don't expect these prices done. And please don't ask to that also is impossible

$ $ $ SAVED IN OUR LAD
—Secon

½ FARE
On Street Cars — Give Post Cards To Conductor

LADIES
THREE RACKS-
Dolla



Regent Theatre BEAVER FALLS

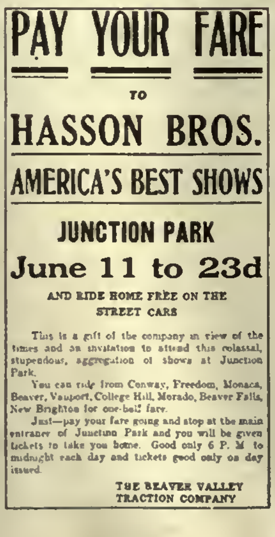
THREE DAYS—MONDAY, TUESDAY AND WEDNESDAY
February 28th, March 1st and 2nd.

Charlie Chaplin in "The KID"

The first showing in Beaver Valley of this $1,000,000 picture

CONDUCTORS ON STREET CARS—
Will sell you a ticket having six zone fare tickets on together with admission ticket to the theatre for fifty cents.

If attending the show from Beaver, Bridgewater, Rochester, Freedom, Conway or Monaca you save 18 cents. Save time waiting in line. Ticket good at any performance showing this picture and car tickets good any time of the day or night these three days. Just ask the conductor for a Regent ticket. Cost fifty cents. You save 18 cents round you and the time waiting at theatre



PAY YOUR FARE
TO
HASSON BROS.
AMERICA'S BEST SHOWS
JUNCTION PARK
June 11 to 23d

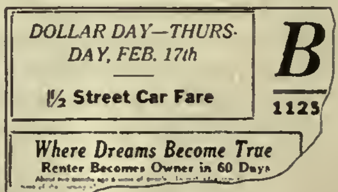
AND RIDE HOME FREE ON THE STREET CARS

This is a gift of the company in view of the times and an invitation to attend this colossal, stupendous, aggregation of shows at Junction Park.

You can ride from Conway, Freedom, Monaca, Beaver, Vanport, College Hill, Morado, Beaver Falls, New Brighton for one-half fare.

Just—pay your fare going and stop at the main entrance of Junction Park and you will be given tickets to take you home. Good only 6 P. M. to midnight each day and tickets good only on day issued.

THE BEAVER VALLEY TRACTION COMPANY

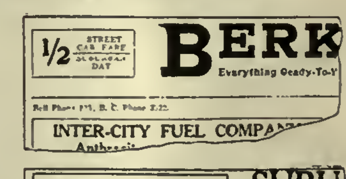


DOLLAR DAY—THURSDAY, FEB. 17th

½ Street Car Fare

B
1125

Where Dreams Become True
Renter Becomes Owner in 60 Days

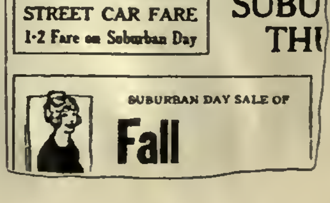


½ STREET CAR FARE SUBURBAN DAY

BERK
Everything Ready-To-W

Bell Phone 171, B. C. Phone 222.

INTER-CITY FUEL COMPA
Anthraci



STREET CAR FARE
1-2 Fare on Suburban Day

SUBU
THU

SUBURBAN DAY SALE OF
Fall

After all is said and done all methods of merchandising transportation are partly wasted without the good will of the public. It is yours for the asking and doing—

GOOD WILL OF PUBLIC CAN BE HAD

IF the heart is right;

IF you are not a double dealer;

IF you are a good mixer or know you can afford to employ one or more;

IF you can take the time to read of what the other fellow is doing;

IF you are not so smothered with detail that you do not find time to do new constructive thinking;

IF you realize that some of the sales methods of other successful men are applicable to your business;

IF you "keep your ear close to the ground";

IF you are human and realize that your business success comes from human beings;

IF you are not penny-wise and pound-foolish with expense accounts;

IF you know that adverse public opinion costs you car riders and damage claims;

IF you deal fairly and squarely with employees and public;

IF you realize that there is a lot in that Golden Rule;

IF you know that your regulations and rules should be tempered with human kindness, but not to the extent of lax discipline;

IF you let the members of your organization (who are just disseminators of "inside stuff") know what is going on;

IF you do not permit favoritism to be shown;

IF you realize that today the trouble with that individual might have been overwork, financial or domestic;

IF you know that there have been known cases of supervising officers being of insufficient mental capacity, out of touch with the rank and file, or tyrannical;

IF you know that fair dealing draws men together and that square dealing holds them together;

IF you feel that the transportation game is the greatest game ever;

IF you are a hard player and a good loser;

IF you are not "Mister" to all the people in your community;

IF you remember that, "A soft answer . . . .";

IF you recognize all the rights of others;

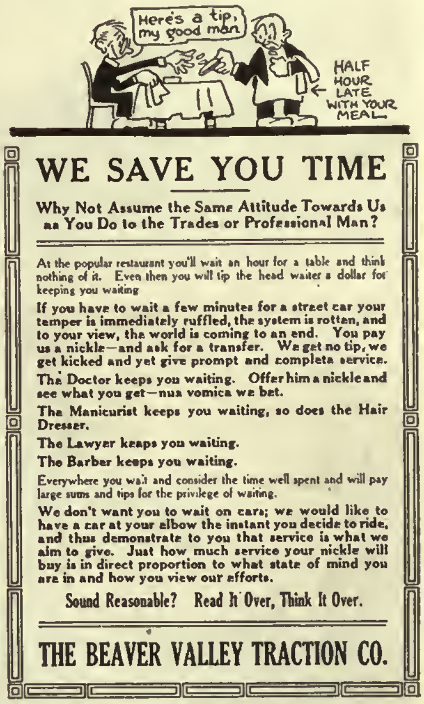
IF you know that America's transportation facilities have done much toward democracizing her;

IF you know that it is more blessed to commend than to condemn;

IF you can be true to yourself.

IF you play the game fairly—and put all the cards on the table.

But, it is now 2:30 a.m. IF I don't get to bed I won't be in shape tomorrow to meet the "IFS." I must not get into that condition; for, believe me, being able to recognize the "IFS" and call them by their first names is a paying proposition in the cultivation of the good will of the public and the merchandising of transportation.


Here's a tip, my good man
HALF HOUR LATE WITH YOUR MEAL

WE SAVE YOU TIME

Why Not Assume the Same Attitude Towards Us as You Do to the Trades or Professional Man?

At the popular restaurant you'll wait an hour for a table and think nothing of it. Even then you will tip the head waiter a dollar for keeping you waiting

If you have to wait a few minutes for a street car your temper is immediately ruffled, the system is rotten, and to your view, the world is coming to an end. You pay us a nickle—and ask for a transfer. We get no tip, we get kicked and yet give prompt and complete service.

The Doctor keeps you waiting. Offer him a nickle and see what you get—nux vomica we bet.

The Manicurist keeps you waiting, so does the Hair Dresser.

The Lawyer keeps you waiting.

The Barber keeps you waiting.

Everywhere you wait and consider the time well spent and will pay large sums and tips for the privilege of waiting.

We don't want you to wait on cars; we would like to have a car at your elbow the instant you decide to ride, and thus demonstrate to you that service is what we aim to give. Just how much service your nickle will buy is in direct proportion to what state of mind you are in and how you view our efforts.

Sound Reasonable? Read It Over, Think It Over.

THE BEAVER VALLEY TRACTION CO.

ADVERTISEMENT ON DELAYS

THE BEAVER VALLEY TRACTION COMPANY

New Brighton, Pa., Feb. 17, 1921.

DEAR SIR:

You have a fine store. Show windows nicely dressed. Sales people neat appearing and courteous. You have a large stock. You can give a prospective purchaser a large selection.

But you cannot make large sales nor many sales unless you get people into the habit of coming to your store. You know the most buying is done in the crowded store. More goods are sold to the "sight" buyer.

You go to New York, to the shop or to the mill, just so that you can see the goods. Manufacturers have traveling salesmen for the purpose of "showing the goods." That conclusively proves that the sale made through exhibition of the goods is the satisfied sale, and, also that exhibiting the goods sells.

Now we are getting to the point.

Telephone orders must be delivered. The expert telephone salesman has not yet been developed; in the present stage they are order takers, and in reality do not sell or increase business for you.

To encourage shopping by telephone detracts from the number of sales possible when the customer calls in person, and increases your number of deliveries. The telephone, of course, has its use in the business but as a sales adjunct it does not compare favorably with the personal contact.

Can you not so frame your advertising that it will get more people into your store? Here is where our interest comes in. Get them to ride down. It keeps them in a good humor. When the people are riding you are selling more goods. When they walk or stay at home your business falls off. You could even afford to refund the car fare on purchases over a certain amount.

In what way can we help you to get the people to visit your store?

Very truly yours,

GENERAL MANAGER

CIRCULAR LETTER SENT TO EACH STORE PROPRIETOR IN THE DISTRICT IN FEBRUARY OF THIS YEAR

THE BEAVER VALLEY TRACTION COMPANY

New Brighton, Pa., Jan. 28, 1921.

TO GENERAL MANAGER OF THE FACTORY ADDRESSED.

Dear Sir:

In order that we may promote the punctuality of, and give improved transportation service to your employees, will you kindly fill out and mail the following facts in the inclosed envelope:

Number of persons employed during normal times ....

Number now working......................

Time work starts..........................

Time of quitting..........................

Number of female workers................

It will also help us to serve you better if you will advise us when you increase or decrease the number of your employees.

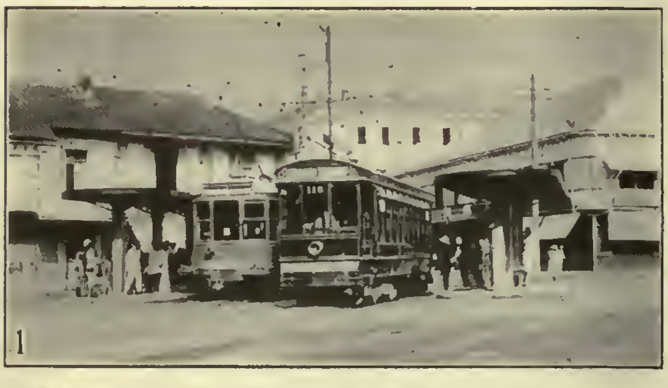
Signed ....

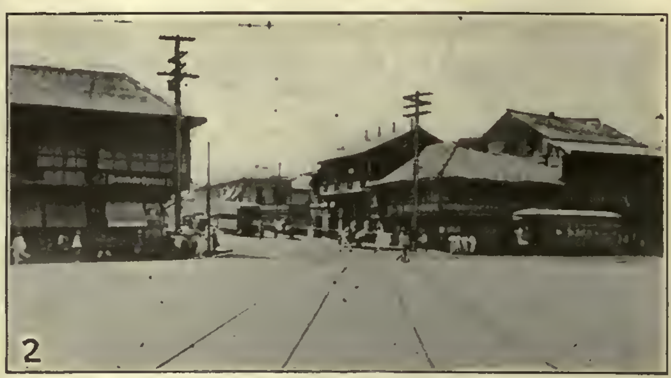
Name of Plant....................................

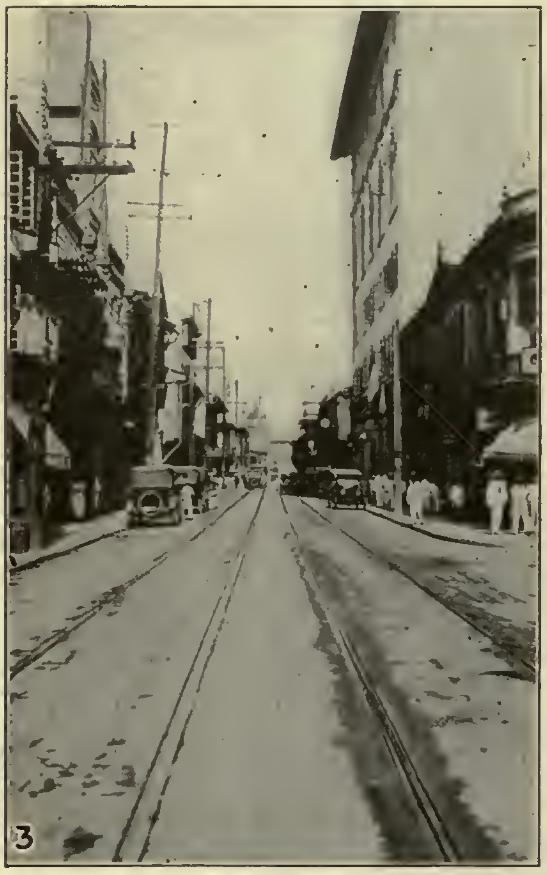
....

Return to:
W. H. Boyce, General Manager,
New Brighton, Pa., in the
inclosed envelope.

CIRCULAR LETTER SENT TO EACH FACTORY IN THE DISTRICT IN JANUARY OF THIS YEAR







Views in Manila on the Meralco Line

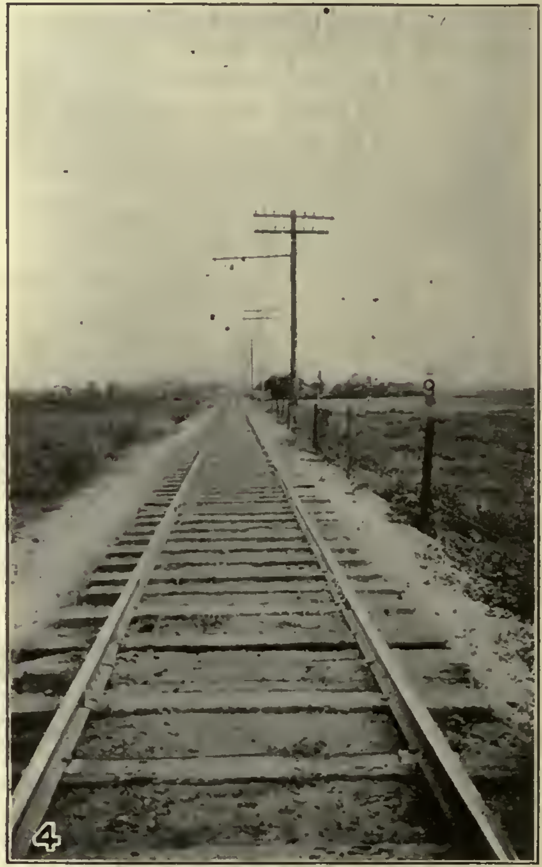
No. 1—Waiting station at Plaza Goiti.

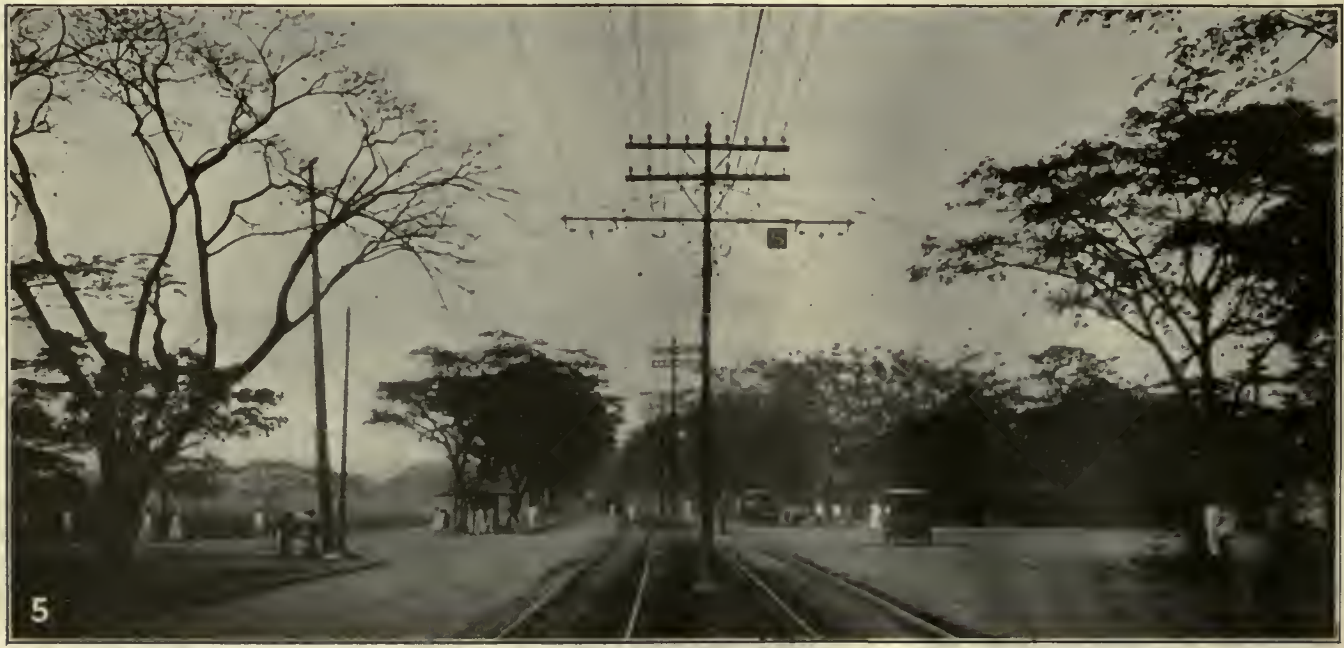
No. 2—Plaza Binondo, looking toward Blanco Bridge.

No. 3—A typical business street.

No. 4—A section of open track construction.

No. 5—Center pole construction in one of the fine boulevards in Manila.





Manila Railway Business Growing

ONE of the largest utility properties outside the United States, conducted by an American company, is the Manila Electric Company, which operates the electric railway and light system at Manila, Philippine Islands. The outstanding capital stock (all common) is $5,000,000, on which the company has paid dividends every year since 1906. The rates from 1906 to 1914 varied from 3 per cent to 7 per cent; since 1914 the rate has been 6 per cent each year. The earnings of the company, both gross and net, have been larger this year than last, in spite of the fact that the Philippine Islands have felt the world-wide business depression of the last twelve months. But it has not been as acute there as in many parts of the United States, as there have been no large manufacturing plants to close down.

The company owns 52 miles of track, about 130 passenger motor cars and a number of trailers, the latter used principally during the rush hours. At present the company has a number of open cars, but these are being converted to semi-convertible end-entrance cars. The cars are divided into two sections to provide accommodations for first-class and second-class riders. The two compartments are separated by a leather strap extending across the aisle. Otherwise there is no difference between the accommodations supplied to first and second-class passengers, and when the car reaches the end of the line the compartments are reversed. Eighty per

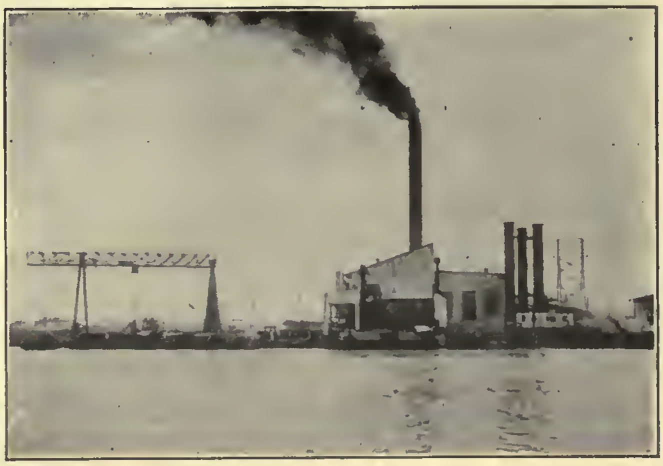
THIS BOILER ROOM IS WELL VENTILATED

SPANISH ARCHITECTURE IS USED IN MAIN CARHOUSE AND OFFICE BUILDING

THE COMPANY'S BALL TEAM, CHAMPION OF THE MANILA BAY LEAGUE

THE BALL TEAM WAS ALSO THE WINNER OF THE "QUEZON" CUP

OPEN STORAGE BUNKER RECENTLY COMPLETED



POWER STATION FROM THE RIVER

cent of the traffic is second class. The first-class fares are: cash, 6 cents, and tickets, 5 cents. The second-class fares are: cash, 5 cents, and tickets, 4 cents.

At present power is being supplied from a steam station of over 10,000-kw. capacity and a new 5,000-kw. turbine generator is now being installed. Most of the coal used comes from China, and the company has recently completed a large storage bunker with circular crane, as shown in one of the accompanying illustrations. Other typical views are shown. The property is operated by the J. G. White Management Corporation.

German Conditions Not Favorable

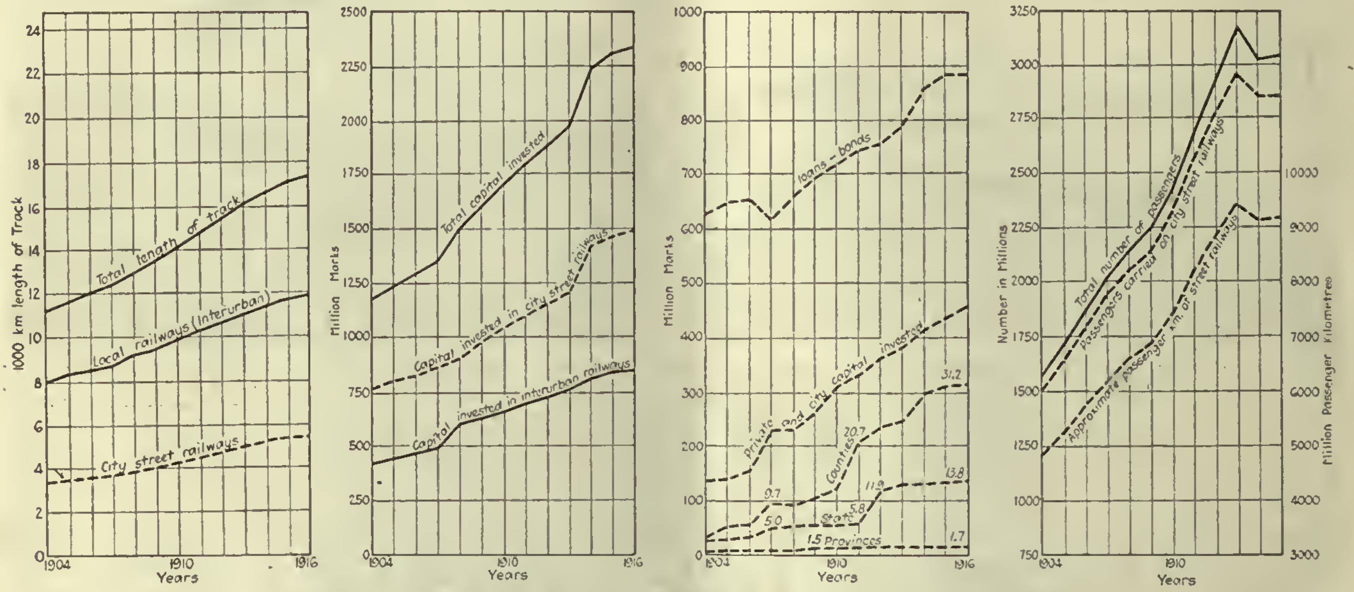
Some Properties Are Being Taken Over in Whole or in Part by Municipalities, but Cities Have Difficulty in Financing Improvements

AFTER the German revolution a number of German street railway systems were taken over in part or in whole by the municipalities. This policy was accepted without opposition in most cases by the owners. Track and rolling stock had deteriorated considerably during the war and large capital investments would have been required in the early future. This fact and the great cost of materials greatly facilitated negotiations for the transfer of ownership. The method of municipalizing differed in various cases. The most frequent forms were the following: (1) Purchase of the assets; (2) purchase of the capital stock, after which in two cases the company was dissolved; (3) purchase of part of the company's stock, in most cases the control, whereby the company retained ownership.

The most extensive transaction of the kind mentioned was the taking over by the city of Berlin of the Berlin street railway system, which was owned by the Grosse Berliner Strassenbahn Aktiengesellschaft. This transaction was effected by the purchase of all of the assets of the company by the municipality, at a price 40 per cent higher than the nominal share capital, which at that date was about 100,000,000 marks. The purchase price was paid in bonds issued by the city. In Leipzig the stockholders received city bonds at par, plus a small cash bonus per share for their property. In Erfurt the city acquired two-thirds of the capital stock of the company, the transfer being made at 1,030 marks per share, while the last stock exchange quotation was 1,580 marks. The management gives as a reason for such sacrifice that it regarded "the future financial situation of the formerly prosperous and sound enterprise as hopeless." In Hamburg the state took over 56,130,000 of the total capital stock of 103,530,000 marks. Private investors thus retain the controlling interest, while the state is the largest stockholder. After 1943 the state may take over the property at a price based on the average gross revenue of the previous five years. The state also guarantees interest and amortization of the bonds.

Public ownership of the railway properties has not greatly improved their financial status. In fact, it has been rather the reverse, and a number of cities are actually contemplating the transfer of the railway back to a private organization in which it is intended to keep a part interest. This seems imperative for the reason that the large capital investments required for making up the deficit and for renewals of rolling stock, track and the necessary maintenance generally exceed the financial ability of the city's treasury. Moreover, the organization of the municipalities is not elastic enough financially to raise new funds, city loans being out of favor with the public. For providing fresh capital, the commercial company proves by far the better organization.

The statistics in the accompanying charts give a general idea of the status of German street railways. They are from a paper presented at the Vienna meeting of the Internationale Strassenbahn und Kleinbahn Verein, by Prof. Dr. Helm.



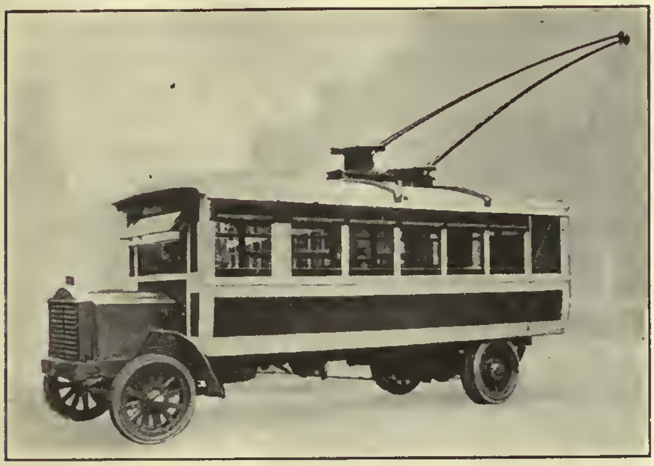
Mileage Statistics and Capital Invested in German Street and Interurban Railways—Division of Capital in City Electric Railways—Statistics of Passenger Traffic

Auto Men Adopt Truck Speed and Weight Allowances

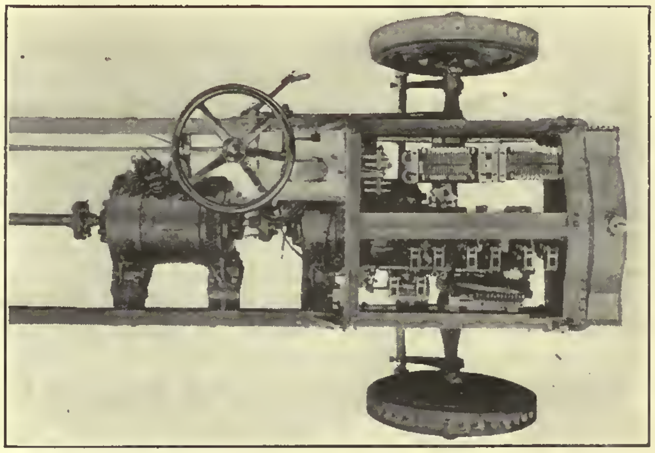
AT A RECENT session of the motor truck members of the National Automobile Chamber of Commerce new standards for body weight allowances, gross weight, chassis, body and total load and new standards for speed were adopted.

Under the new standard the speeds adopted are now, for trucks, including gross weight, chassis, body and total load, up to 2,800 lb. when equipped with pneumatic tires, 25 miles per hour; with a load up to 4,000 lb. on solid tires 25 miles per hour; 8,000 lb., 20 miles per hour; 12,000 lb., 18 miles per hour; 16,000 lb., 16 miles per hour; 20,000 lb. and over, 15 miles per hour.

These speed ratings will be recognized by the manufacturers as a maximum and will not be exceeded under any conditions. Body weight allowance adopted for 1 and 1½-ton trucks was limited to 1,200 lb.; for 2 and 2½-ton trucks, 1,500 lb.; for 3, 3½ and 4-ton trucks, 2,000 lb.; for those of 5 tons capacity and over, 2,500 lb.



Packard Trolley Bus Complete with the Standard Gas-Engine Chassis



Front End of Chassis Showing Method of Mounting Equipment

Details of Packard Trolley Bus

Trial Tests in Detroit of New Vehicle Make Favorable Impression on City Officials — Brill Body on Packard Chassis with Westinghouse Electrical Equipment

THE trolley bus recently built by the Packard Motor Car Company of Detroit to prove the adaptability of the Packard truck to electrical equipment has been given a try-out over a special line built on Harper Avenue by the Detroit Municipal Railway System.

This trolley bus differs in some aspects from others in that it is designed so it can be readily converted into a gasoline-driven unit without any material changes in construction. It also carried two trolley poles, one for each wire. While ultimate service with the trolley bus would undoubtedly require a loop for turning, tests have demonstrated that it was possible to Y the vehicle in a narrow street, the same as any self-propelled unit. The operation, however, required one shift of the trolley poles. With the two poles used such an operation was thought to be impossible, but it is evident the bus can run backward under its own power.

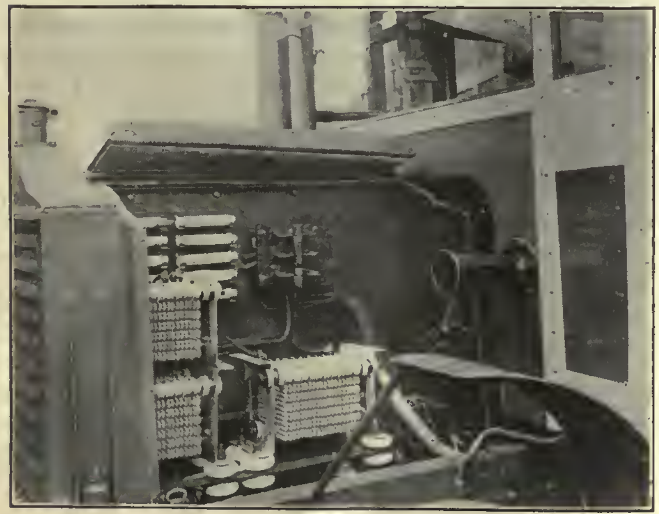
The foot type of control used affords smooth acceleration, and tests showed it could attain a speed of 15 m.p.h. in ten seconds. The maximum speed of the vehicle is 22 m.p.h. A motor-driven sequence switch controls the operation of the resistance notches as well as the transition from series to parallel operation. The speed of this sequence switch motor is directly affected by the current in the propulsion motors.

The design of the bus is shown in accompanying illustrations. It has a seating capacity of twenty-five with considerable space for standees. The floor height is about 2 in. more than the modern safety car and two steps are necessary for boarding. The body is about 25 ft. long. The complete vehicle weighs 11,800 lb., of which 57.5 per cent is carried on the rear wheels. The chassis, including motors, control apparatus and resistors, weighs 7,190 lb., which is 175 lb. less than if equipped with a gas engine.

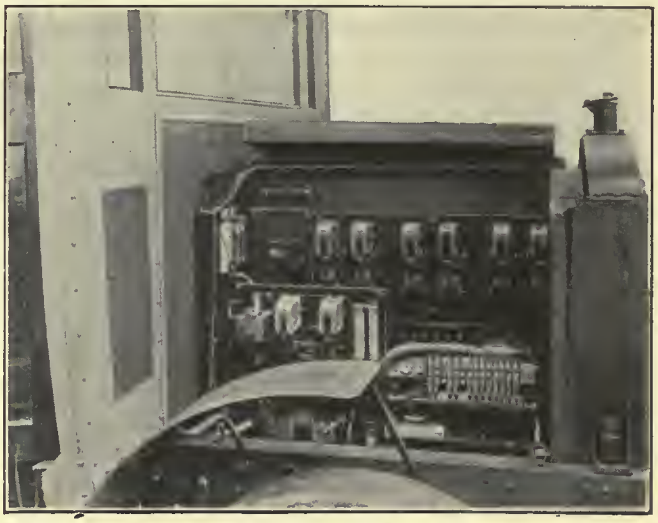
The body, built by J. G. Brill Company, is mounted on standard ED Packard chassis. Two 25-hp. Westinghouse safety car motors mounted in tandem furnish propulsion. The total gear reduction from motor to wheels is 1.75 : 1. The wheels mount 34-in. cushion tires.

The current collecting devices consist of two separate trolley bases with 18-ft. poles, swivel harps and 5-in. trolley wheels having U-shaped grooves. The trolley bases are mounted on the longitudinal axis, one 30 in. back from the other, with the front base elevated 10 in. above the rear base. The running board is approximately 11 in. above the ground.

The control apparatus includes two small electrically operated line switches complete with overload trip, six small resistance and transition switches, a foot controller, a manually operated reverser, a motor cut-out



Resistors, Fuses and Motor Cut-out Switch in Left-Hand Side of Hood



The Controller and Contactors Are Located on the Right-Hand Side of the Partition switch and a set of starting resistors. All of this apparatus is mounted within the usual engine hood, the resistors being mounted on one side of the center line whereas the circuit interrupting devices and other important control items are located on the other side where they are ventilated, yet protected from the weather as shown in the illustrations. The partition dividing the hood into two compartments is of a heat resisting insulating material which acts more or less as a switchboard for the control apparatus.

The reverse and overload reset levers project through the dash at a point convenient to the operator.

Selling Transportation at Pageant

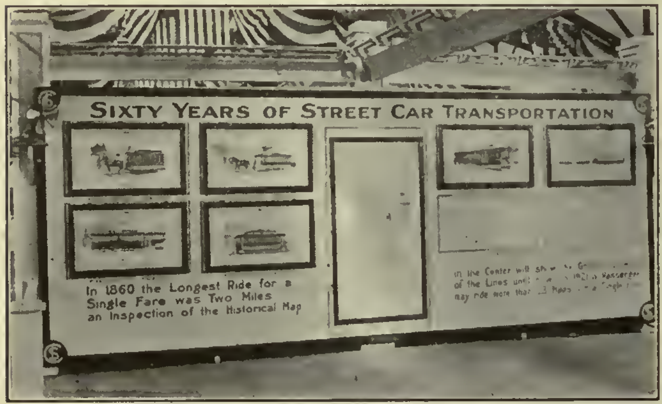
Electric Lines in Chicago Capitalized Opportunity to Tell Nearly One Million People in Attendance at Pageant of Progress Facts About the Railways

THE Chicago Elevated Railways, Chicago Surface Lines and Chicago, North Shore & Milwaukee Railroad made the most of the recent Pageant of Progress held on the Municipal Pier in Chicago, July 30 to Aug. 14, to interest the people in attendance in the magnitude of the enterprises carried on by the local companies and to "sell" them on the character of service supplied. During the sixteen days of the pageant there was an average daily attendance of 55,000, of whom a large proportion stopped at the railway booths long enough to show interest and carry away new impressions and copies of the city map and small booklet prepared by the Illinois Committee on Public Utility information entitled "Chicago's Genii, the Public Utilities," and containing some very interesting information about each of the local public utilities. All three of the booths were filled with people practically all of the time and those who represented the companies report great interest and believe that, judging from the large number of questions asked and discussions entered into, the cause of the local railways was greatly helped.

John E. Wilkie, assistant to general manager Chicago Surface Lines, having in mind the general diffidence of the public toward statistics, endeavored so to portray four or five main points that the guests would naturally absorb them, or at least take away the correct impression. Across one end of the booth in which the Surface Lines' exhibit was displayed was a series of beautifully water-colored pictures showing the progress of the type of cars used since 1860, carrying the memory of the "old timers" back to the horse-car days and through the cable cars, early electric cars, to the modern street cars and new trailers now being installed in Chicago. The observer was reminded that in 1860 the longest ride for a single fare was 2 miles, while it is now 33 miles.

On a board at the opposite end of the booth were graphically shown some figures giving an idea of the magnitude of the Surface Lines' business, the amount of money invested and the rush-hour problems. The main points brought out here were that the number of passengers carried in a year by the Surface Lines is practically equal to the population of the entire world; that the trackage is equal to a double-track line between Chicago and Buffalo; that more than 50 per cent of all the revenue collected goes to wages, while only 4.71 per cent goes to the company; that the cars travel more than 118,000,000 miles a year; that the company employs more than 15,000 employees, etc.

In the center of the booth was a four-wing board on which were mounted enlargements of pictures showing the great traffic congestion and therein explaining some of the causes of delay to the street cars. A transfer-counting machine which will count accurately 800 transfers a minute attracted a great deal of attention, this being operated almost continually and impressing how the company values and accounts for all transfers. The thing which perhaps startled the visitors most of anything was the large box made up to represent the bulk of one day's supply of transfers used on the Surface Lines. This is almost astounding even to a railway man. It is shown in an accompanying picture and it measures 7 ft. 7 in. x 4 ft. 10 in. x 3 ft. 10 in.


SIXTY YEARS OF STREET CAR TRANSPORTATION
In 1860 the Longest Ride for a Single Fare was Two Miles an Inspection of the Historical Map

SIXTY YEARS OF STREET CAR TRANSPORTATION AS DEPICTED BY CHICAGO SURFACE LINES

CHICAGO IS A CITY OF GREAT ENTERPRISES
FACTS ABOUT THE CHICAGO SURFACE LINES
WORLD'S POPULATION 1,730,294,324
SURFACE LINE PASSENGERS CARRIED IN ONE YEAR 1,353,171,493
DISPOSITION OF REVENUE

A FEW STARTLING FACTS PRESENTED IN A WAY TO MAKE AN IMPRESSION

A good deal of interest was also manifest in the picture shown by two photoscope machines which ran continually. One of these was intended to teach safety-first lessons and showed chiefly boarding and alighting accidents and affording some humor as well as serious thought. The other photoscope showed pictures taken at some of the beaches, parks, ball parks, Art Institute, Field Museum and various spots of beauty and pleasure about the city, and each view carried directions as to how to get there by street car.

Having anticipated warm weather and shortage of drinking facilities, the Surface Lines' booth became very popular as a watering spot. On the first day, before the concessionaries got started, a police detail was necessary to line the people up for a drink and one hundred 5-gal. bottles of water were served that Sunday afternoon. Another popular feature of the exhibit was the map of the city telling about points of interest and how to get there. About 30,000 copies a day of this map were given away.

METROPOLITAN ELEVATED RAILROAD

	1895	1920
Population served	339,287	642,562
Property value (Logan Square)	$100	$750

SOUTH SIDE ELEVATED RAILROAD

	1893	1920
Population served	93,374	420,716
Property value (Sixty-third and Halsted)	$40	$1,750

OAK PARK ELEVATED RAILROAD

	1893	1920
Population served	94,602	156,982
Property value (Oak Park)	$50	$300

NORTHWESTERN ELEVATED RAILROAD

	1900	1920
Population served	238,679	431,636
Property value (Wilson Avenue)	$60	$2,000

It is to be regretted that, despite various attempts, the exhibit of the Chicago Elevated Railways would not photograph, for it represented a very fine piece of work. It consisted in the main of a huge map of the city mounted in a beautiful frame and showing, with the help of excellent illumination, the lines of the several elevated railways. Ribbons attached to the map at a certain section of the elevated lines extended out to tables of data on the sides of the booth where figures showed the relative population served and property value when the line was built and in 1920. The principal data thus shown are of interest to the railway field and are given in the table above.

THE THING WHICH PRODUCED THE MOST EXCLAMATIONS

Numerous pictures also showed how territory looked when the elevated was first built and how it looks now. Other pictures showed some of the elevated construction work, different types of equipment, etc. A map of the elevated railways contained in a folder, pointing out numerous places of interest in Chicago and how to get there, was also given away. Prominent display was also given to the figures showing that 2,500,000,000 people have been carried in thirteen years without a fatal accident to a passenger.

The exhibit of the Chicago, North Shore & Milwaukee Railroad consisted mainly of a darkened booth in which a motion picture, entitled "Along the Green Bay Trail," which is a very interesting little story designed to attract passenger travel to the electric line between Chicago and Milwaukee, was shown. This picture was run continually and it was surprising the number of people who would stop at the booth and see the picture clear through.

Wage Reductions Approach Deflated Cost of Living

AVERAGE wage reductions of approximately 15.9 per cent since the first of this year for over 4,540,000 workers in industrial concerns in twenty key industries throughout the United States are shown in an analysis of industrial wage tendencies made by the J. L. Jacobs Company, engineers and statisticians of Chicago. The survey made includes a digest of reports from official documents and reliable periodicals, covering 693 establishments or industrial groups which are typical of the industrial and utility activities of the country.

The summary analysis from the 693 establishments reporting show that approximately 43 per cent of these industries reduced wages 20 per cent or over; that 19.9 per cent reduced wages between 15 per cent and 19 per cent; that 30.4 per cent reduced wages between 10 per cent and 14 per cent, and that about 6.5 per cent reduced wages less than 10 per cent. This average wage reduction of 15.9 per cent for industrial workers throughout the country is still below the average reduction in the cost of living as reported by the United States Department of Labor, or 16⅔ per cent.

WAGE REDUCTIONS BY INDUSTRIES

Industries	Estimated No. Employees Affected	Average Wage Reduction, Per Cent
Cotton manufacturing	205,000	26.5
Hosiery and underwear manufacturing	7,000	24.3
Leather manufacturing	14,500	23.6
Boot and shoe manufacturing	25,000	22.0
Electrical manufacturing	70,000	21.5
Car building and repairing	15,000	20.8
Iron and steel manufacturing	400,000	20.7
Mining	125,000	20.4
Woolen manufacturing	100,000	20.3
Building materials manufacturing	6,500	18.7
Public employment	35,000	18.6
Rubber goods manufacturing	10,000	18.3
Silk manufacturing	20,000	18.2
Building trades (cities)	380,000	18.1
Paper manufacturing	23,000	16.7
Men's clothing manufacturing	100,000	16.7
Public utilities	115,000	15.9
Shipbuilding	105,000	14.7
Meat packing industry	200,000	13.7
Express employees	50,000	12.0
Steam railroads	1,829,000	12.0
Miscellaneous	705,000	17.6
Total	4,540,000	15.9

The outstanding reductions of wages that have been made in the last sixty days are among the public utilities, the building trades and the iron and steel industries. Nearly half of the total reductions in wages among the public utilities since the first of the year have been announced in the last sixty days. The available reports show that 109 utility companies, chiefly street railways, have reduced wages from 5 per cent to 40 per cent, the majority of the reductions lying in the range from 10 per cent to 20 per cent. No important strikes were reported following the wage reductions by these utilities. In the building trades there has been a continued voluntary action on the part of workers to accept lower rates of pay in the hope of increasing building activities. In some instances the reductions reported and accepted were the second that have been made since the beginning of the year. The iron and steel workers have received the second and in some cases the third reduction since the beginning of the year. Wage reductions in this industry average about 20.7 per cent.

The table on page 361 shows the average wage reductions and approximate number of workers affected, distributed according to the key industries. Were the railroad employees, whose salaries were reduced approximately 12 per cent, taken out of this group, the reduction of the remaining 2,700,000 employees would average 18.7 per cent.

Effect of Brakes or Slipping Wheels on Tires and Rails

THE rapid acceleration and the deceleration now used on street railways have introduced some rather dangerous effects caused by the brakes or by slipping wheels acting on the tires and rails. C. P. Sandberg in a paper read at the Engineering Conference, London, 1921, treats of these actions in a very interesting manner. The energy absorbed by the brakes is immediately converted into heat and this heat must be dissipated chiefly by conduction into the mass of metal behind the slipping surfaces. The rate of such heat conduction is limited and if the rate at which heat is generated is greatly in excess of this limit a marked local rise of temperature will take place. If the surface temperature does not exceed the lower limit of the critical range of the material then no marked changes will occur beyond those due to mechanical deformation and abrasion, but if the critical temperature is exceeded, then in any ferrous material containing over about three-tenths per cent carbon very definite structural changes will occur. If the thickness of the heated layer is small in comparison with the whole mass, then when the heating effect ceases the surface will be very rapidly cooled by conduction, and if the initial temperature is high the outer layer of metal will be left in a very hard or martensite state. The surface hardening in itself would not result in any detrimental effects were it not for other phenomena that occur due to this action. A study of surfaces under this condition indicates that the thermal formation of a hardened outer skin is accompanied by the sliding of one surface over the other to a point at which both surfaces have become so heated that they are soft and plastic and tend to seize together at numerous points of contact. While so united the surface layers are dragged bodily forward, forming an overlap in advance of each area of adhesion and a tear behind it. The adhesion is only momentary and the surfaces are quickly dragged apart and recommence to slip over one another until sufficient rise of temperature and softening have occurred to cause another seizing. This alternate action of seize and slip probably occurs many times per second during the application of brakes and gives rise to the jarring or squeaking noises which accompany such applications. The result is to produce a series of surface tears or cracks upon both brake shoes and the wheels or rails, the cracks running in a direction at right angles to that of the motion and forming at regularly spaced intervals, evidently bearing a relation to the periods of seize and slip. These notches and rough surfaces put the material in a condition for very easy failure under ordinary load and increase the maintenance costs.

Letters to the Editors

Discussion on Association Reorganization

FOLLOWING *the suggestions of President Gadsden and the executive committee of the American Association that the reorganization question be fully discussed, the* ELECTRIC RAILWAY JOURNAL *has solicited letters on the subject, both editorially and by a few personal communications and has offered space in its columns for the purpose. The following letters on this subject will prove of interest and value to the association in its study of the executive committee's recommendations.*

BOSTON ELEVATED RAILWAY COMPANY
BOSTON, MASS., Aug. 18, 1921.

To the Editors:

I have read with considerable interest the contemplated action in regard to reorganization of the association. I have not as yet had an opportunity thoroughly to analyze the situation, but in compliance with your request I am expressing certain opinions which come to me in my first analysis.

I believe that the changes recommended by the executive committee are all for the best interests of the association and the policies adopted by the executive committee also seem to me to tend toward more constructive effort in the work performed throughout the year. One point which I did not notice mentioned and about which I feel very strongly is the desirability of limiting the committee work to that amount of work which can be accomplished effectively without burdening the member companies with undue requests for information. I think there has been a tendency in the past to provide a list of subjects for a committee which in view of the practical limitations of time has not resulted in concentration of the efforts of the committee on the amount of work which they can do well and thereby produce constructive results; in other words, spreading the work too thinly. This plainly is not in the interests of progress, but tends to an indifferent attitude and does not produce results.

I note the recommendation that individual members from non-member companies be not admitted. I appreciate the basis upon which such a decision was reached, but it seems to me manifestly unfair because, if temporarily the powers that be in control of a property feel that from a policy standpoint they do not desire to become a member, the association is prevented from availing itself of the ability and desire to work of a capable executive or officer of that company who might personally be inclined and be of value to the industry. It seems to me it is a discrimination. I can see where should a bright, energetic individual in a company become associated and interested in the work he might be the factor which would secure for the association the membership of his company.

As regards the question of admission of municipally owned railways, there is ample ground for divergence of opinion, but from a broad viewpoint consistent with modern conditions and for the good of the industry and its credit at large, it would seem to me as if here again it was short-sighted policy to close the doors against men many of whom have drifted from privately operated companies to the service and are not less capable street railway operators. If they increase in numbers and feel this disbarment, there is likelihood of a separate organization, which certainly is not to the advantage of the industry as a whole.

As regards the training of potential presidential nominees, while in theory it may sound correctly, if by chance in the appointment to the lowest vice-president's position there comes a man who is not of sufficient caliber for constructive leadership it is not to the interest of the association to have him take the reins. On the other hand, while the arrangement provides that it is not absolutely necessary, it is unfortunate, both for the individual and for the effect it has in general, to be working along the line of succession and then have to break it. Too often in the past this arrangement has led to charges of clique control. An association as broad and far-reaching as the American Electric Railway Association must in all events be free from any such impression if it is to be of utmost service to this tremendous industry. The requirements of the time must dictate without any embarrassment about leaders.

I prefer the committee's recommendation of two junior living past-presidents with power of vote rather than all of the living past-presidents without power of vote, as I believe that the reorganization committee conclusions of the responsibility for management being placed squarely on the men elected is preferable to the indeterminate dropping in of living past-presidents. It would of course be wise to permit living past-presidents without vote to attend meetings out of courtesy and to secure the benefit of their experience, so that under the recommendation of the reorganization committee both advantages are possible, whereas under the recommendation of the executive committee they are not. EDWARD DANA, General Manager.

EAST ST. LOUIS & SUBURBAN RAILWAY COMPANY
EAST ST. LOUIS, ILL., Aug. 26, 1921.

To the Editors:

In your report of the meeting of the executive committee of the American Electric Railway Association held on Aug. 8, you in effect asked for a discussion of the revised constitution as drafted by the executive committee. As the intent of the adoption of the revised constitution is to rectify past errors and is a very important step, it seems but proper and meet that there should be a thorough discussion so that those who have not had the advantage of attending the reorganization and executive committee meetings may be better enabled to form their opinions as to the merits of the proposed changes.

All in all, the revised constitution appears to me to be a real step in advance, which will enable the association to go forward on a more business-like and efficient basis than ever before.

I am particularly impressed with the underlying thought that members of the executive committee are in the future to do real work and take real responsibility. This is as it should be. No man should accept office who is not prepared to accept the work and responsibility. The revised constitution makes it very evident that the executive committee is a working, managerial committee.

Another helpful step is the formation of sub-committees with real responsibilities, which will report to the executive committee at its monthly meetings. Heretofore sub-committees have been few in number and there have been no meetings of the executive committee for them to report to, except two or three times a year. Forcing a sub-committee to report to the executive committee once a month, and having it placed on record as to what its report is and what its recommendations are, puts the sub-committee members where they must take real responsibility and analyze the work assigned to them, at least to the extent that they may be able to make a report.

I am also much impressed with the new method of appointing the nominating committee long enough in advance of the annual meeting so that the nominating committee itself may have an opportunity to sound the sentiment of the membership, and the members may have an opportunity to express their views as to the future officers. This appointment of a nominating committee in advance appears most advantageous from every standpoint, and will especially remove any cause for complaint. Every one will have an opportunity to express his views in plenty of time, and the new officers elected will be as nearly as possible the choice of the membership at large, or if this is not the case it will be due entirely to the fault of the membership. Another factor is that nominations and elections have always taken place at the same meeting, and there has often been necessity for undue haste and the complication of finding out not only whom the nominating committee desired to nominate for officers but what timber was available. For these reasons and others, the adoption of the revised constitution will, all in all, be a real step in advance, but there are several sections which should, I believe, be given very thorough consideration.

The executive committee realized that although they had given very considerable thought and study to the revised constitution, there were possibly, and in fact probably, portions of the constitution which others, or even they themselves, might wish to change upon further thought or information. Accordingly the matter was left in such shape that amendments to the constitution can be modified or new ones moved and adopted on the floor of the convention, if desired by the convention. This action was taken premeditatedly and purposely so that the convention would not be forced to accept the revised constitution as drafted, but that, as finally adopted, it could and would be the sentiment of the convention.

ELECTION OF PRESIDENTS AND VICE-PRESIDENTS

Among the sections which provoked considerable discussion among the executive committee members themselves was the question of designation of vice-presidents. It has been our practice in the past to designate vice-presidents as first, second, third and fourth vice-presidents, and also as a rule to elect the senior available vice-president as president, move all the other vice-presidents up one notch and elect a new man as fourth vice-president.

The old or present constitution does not call for such designation, but it was perfectly constitutional and legal to follow this procedure. As a matter of fact, it has become so established by custom as to be almost obligatory on the nominating committee.

At the last annual meeting a resolution was passed to the effect that in the future the policy of the association should be to elect as president the man who was considered best fitted—taking all things into account—to lead us as president for the next year, regardless as to whether he had previously been a vice-president or had held any other office in the association.

But the underlying thought of the executive committee in adopting the portion of the revised constitution which covers this point was, as I understand it, that we should return to the old order; that is, that the regular routine should be to elect a fourth vice-president and promote each of the other three vice-presidents. The revised constitution does not say that this should be done, nor need it necessarily be done, but the new constitution has gone a step further than the old constitution ever did, in that the constitution itself calls for designation of vice-presidents.

In the discussion the executive committee brought out very definitely the fact that all of the executive committee were not agreed as to either what the constitution should say or what our procedure should be in the future. It was contended by the majority that in order to achieve the best results during his term of office the president should be one who had had past experience with the business of the association for say the past three years. The main contention of the minority was that the convention should be left absolutely free to elect as their president for the ensuing year the man who at that time was available and appeared to them to be the best man to lead them for the ensuing year. This may be, though not necessarily, absolutely contradictory to electing one of the vice-presidents to the presidency, and the main thought of the minority was that we should elect each year the man best fitted to be president for the ensuing year, and not elect (as *vice*-president) each year the man who we thought would in four years be the best available man for the presidency.

If it is the sentiment of the October convention that we should return to the old order and elect a fourth vice-president and promote the other vice-presidents, then the constitution, in so far as this part is concerned, should be adopted as written. If it is the thought of the convention that the membership should not be limited, by insinuation or otherwise, as to who at any future time should be elected president for the ensuing year, then the constitution as drafted should be changed and should state that there should be four vice-presidents *without designation*. This was the way the constitution read when it was recommended to the executive committee by the reorganization committee.

To state the matter boldly, this question may be said to resolve itself into whether we shall so arrange elections that a man shall be chosen president on account of his positive qualifications for the place or because his negative qualifications are not enough to disqualify him.

SHALL MUNICIPAL RAILWAYS BE ADMITTED?

Another point which brought forth considerable discussion was the question of admitting municipal railways to membership on the same basis as company members. This matter first came up last December at the Chicago meeting, at which time a committee was appointed to make a report as to the advisability of admitting municipal companies to full membership, there being a question as to whether or not the constitution provided for their admittance.

The committee took a referendum vote, as it were, among the members of the executive committee and prominent executives of the industry, some fifty altogether, and reported back that of those who had returned answers to the questionnaire, thirty-seven were in favor of admitting municipalities, and five were not in favor of admitting them.

When the matter came up in the reorganization committee some who had previously been in favor of admitting municipalities voted in favor of not admitting them, as, although those opposed to admitting municipalities were very few in number, they were most definite as to the mischief to be wrought to the association and the industry by admitting municipal railways to membership.

The result was that when the matter came up for final vote in the executive committee the vote was almost unanimous to exclude municipal railways from membership in our association. Judging from the replies received when the referendum was conducted, there is unquestionably a division of thought in our membership as to which is the proper course for the association to take. Those contending for the admission of municipal railways stated that due to the fact that executive or secret sessions of this association are now a thing of the past and that it is our policy to teach the truth openly and frankly, no harm could come to the association by admitting municipal railways, and that this frank, open-door policy would in the end be advantageous rather than otherwise. It was brought out that practically every act of ours is now open to inspection and that all and any data sent out by the association can be secured, if desired, by individuals or by municipal railways without being members, and moreover, that the association had nothing which it desires to conceal, but that it truly desires to acquaint the public and also the municipal railways as to facts.

Those opposing municipal railways being admitted to membership were just definitely opposed to municipal railways and therefore wanted none of them in any way connected with the association.

In this connection it should be understood that no member of the executive committee advocated municipalizing street railways, nor were any members of the executive committee in favor of such municipalization, but the minority were in favor of admitting such systems to membership on the basis that it was the better policy for the association and the industry.

The revised constitution as first drafted by the reorganization committee definitely admitted municipal companies to membership but the constitution was redrafted, so far as this matter was concerned, before it was reported back to the executive committee, and as it is now drafted no municipal railway can be admitted.

It is possible that a number of executives not belonging to the executive committee who previously were in favor of admitting municipal railways have by this time changed their minds, as did some of the members of the executive committee, but unless a very large number have done so, the majority of prominent executives to whom the referendum was sent are still in favor of admitting municipal railways to membership. The original referendum showed that of executives not members of the executive committee twenty-three were in favor of admitting municipalities and two were opposed to it.

PAST-PRESIDENTS ON THE EXECUTIVE COMMITTEE

The revised constitution as first drafted by the reorganization committee and reported to the executive committee proposed that the two junior past-presidents should be members of the executive committee, *with vote*. The present constitution provides that all past-presidents shall be members ex officio of the executive committee, *without vote*, and the revised constitution as finally left by the executive committee is practically worded as is the present constitution, that is, all past-presidents of the association are members ex officio of the executive committee.

The discussion regarding this matter was in no way personal but the reorganization committee reported in favor of limiting the membership of the executive committee to the two junior past-presidents only after considerable thought was given this matter. It is realized that past-presidents carry, even without vote, a very considerable weight in any discussion which may arise in executive committee meetings, and the newer members of the executive committee have a normal human tendency to accede to the desires of past-presidents, even though the thought of the new member is that such a course is not in keeping with his own present-day views as to what is best for the association as of today.

On the questions which came up for real discussion in working out the revised constitution, it was noticeable that past-presidents present, speaking broadly and generally, were in favor of continuation of past policies.

"AERA"

There was one question which brought forth considerable discussion in the reorganization committee, and that was the future policy of *Aera*. The *Aera* advisory committee was asked to make a report, and in their report they were very definite that *Aera* should be continued along the lines of the past, with the exception that it should broaden out and cover even more ground than was attempted in the past. This committee report was so definite that a large majority of the reorganization committee after hearing the report were in favor of continuation of *Aera* along the general lines of the past, with, however, the recommendation that duplication of articles appearing in or belonging to the technical press should be eliminated, and that we should co-operate with the technical press rather than be considered as a distinct competitor. The *Aera* advisory committee being naturally composed of members who have previously been prominently identified with *Aera*, and who were appointed due to the fact that they desired in general a continuance of *Aera's* policy, it was not in any way unnatural that this report should be favorable to the continuance of *Aera*. As to whether an unprejudiced committee not so closely identified in the past with *Aera* would have brought in the same report is, of course, open to question. The net result of the discussion, however, was that the situation was not changed and it was the thought that *Aera* should be continued, but substituting co-operation for duplication and competition. If this be carried out the solution will probably be acceptable to a great big majority of the membership. There is no doubt that there is a strong feeling on the part of a considerable number that *Aera* should not and cannot compete as a magazine with the technical press, but should limit itself to appeals to company section membership and to information and data which are needed by the industry but are not available through other sources.

So far as the constitution is concerned, no change was necessary, unless it was desired absolutely to stop publication of any magazine or bulletin, and the future policy of *Aera* rests with the executive committee through the executive secretary and the sub-committee on publications, under whose charge will come the preparation and publication of *Aera*.

Now, just one word in conclusion. I have written the above simply so that executives of member companies may give some thought before they arrive at Atlantic City as to just what we should or should not do in our new constitution. The association will, under the revised constitution, receive much benefit due to the executive committee in the future really functioning as business managers of the association, but the greatest good of all will be for the new constitution to reflect the thoughtful, analytical views of the membership. W. H. SAWYER, President.

NEW YORK, Aug. 18, 1921.

To the Editors:

Unfortunately for the purpose of present discussion, I am unable to attach sufficient importance to the proposed changes in constitution and by-laws of the American Electric Railway Association to justify me in making any extended comment. Rules for the guidance of men of affairs, such as the proposed requirement for monthly meetings of the executive committee, seem arbitrary and are to be avoided in the by-laws of all corporations and associations like the one under discussion.

The success of the efforts which the association will put forth to benefit the industry supporting it will depend not so much on the form of organization as it will upon the substance of its leadership. The right kind of leadership will develop forward-looking policies that may eventually assist in the rehabilitation of an industry that is now all but financially bankrupt.

JAMES D. MORTIMER.

BROOKLYN RAPID TRANSIT COMPANY

BROOKLYN, N. Y., AUG. 23, 1921.

To the Editors:

The recommendations of the special reorganization committee of the American Electric Railway Association were discussed editorially in your columns on Aug. 13. It will be remembered that the proposals made by that committee affect only the work of the parent association. Meanwhile the discussion has caused attention to be directed toward the possible need for the organization of a similar committee to study the work of the Engineering Association.

It has been felt in some quarters that the Engineering Association could greatly increase its effectiveness if some things were done in the way of reorganizing its methods, somewhat along the lines which have been prepared for the parent body. The question of size of committees has assumed a prominent place in the minds of those who have given thought to this subject. At present the committees are fairly large, with from twelve to fifteen members on the standing committees. It is seldom that a full committee meeting is held. Perhaps the nearest approach to this was reached this year when eleven of the twelve members of one committee were present at a meeting.

The number of meetings which can be held is limited, first, by the difficulty in getting members to travel long distances and, second, by the cost of attendance, which is now a direct burden upon the member companies whose men are upon the committees. It is thought that this burden tends to restrict membership in committees to those companies both able and willing to bear the expense. This may tend to keep good committeemen from active participation in the work. Another handicap to large committees is the difficulty and expense in providing copies of correspondence, and the correspondence of an active standing committee assumes large proportions. Again, the cost of preparation of reports in sufficient quantity to provide for the membership becomes a burden upon the unfortunate company whose representative happens to be a chairman. It is stated that one important report due to be issued this year required the constant work of two stenographers for two weeks.

The number of subjects assigned to standing committees is frequently too large, and even progress reports on many of them are not forthcoming. Fortunate indeed is the committee which can adequately report on more than three subjects.

The suggestion has been made that smaller committees should be the rule and that there should be more committees. For instance, the American Railway Engineering Association has five or six committees covering subjects which the Engineering Association attempts to cover by one standing committee. With smaller committees, each handling an important subject, there should be a much better opportunity for careful study of subjects and the reports on them could thus be treated more completely. As a matter of fact, the standing committees now have to divide into numerous sub-committees in order to get any work done, but this method divides the responsibility somewhat and often results in lack of production, with a tendency toward acceptance of sub-committee reports by main committees without careful study of details.

The task of assembling a report of any one of the large standing committees becomes a burden upon the chairman which consumes a great deal of time. Only the pride of the chairmen in having a creditable report keeps them from giving up the jobs in despair.

The matter of selection of subjects also seems to require a more careful consideration than has been given heretofore. Those subjects which are of the greatest practical value should have first consideration, and subjects which mainly call for theoretical consideration might well be assigned to individuals for treatment in monograph form. It is no secret that some of the best reports in the past practically have been the work of one man.

Many subjects cannot well be handled by large committees because of the lack of adequate information from member companies, who are generally becoming more and more adverse to answering questionnaires. Some better means for getting such information should be found, and perhaps the best way to get it is to employ a research engineer who can visit a sufficient number of properties to gather authoritative data covering a definite line of inquiry. Such a method of getting valuable and needed information would also tend toward increasing the use of association standards through the personal contact of the research engineer with the representative "local conditions" which now mitigate against the adoption of standards.

It is also thought that the committee reports should not all be dumped in a mass upon a busy engineer's desk about a month before the annual convention. He cannot possibly find time to digest them sufficiently to prepare suitable discussion, and one great failing now found is the lack of constructive discussion of reports on the floor of the convention. It has been suggested that the plan of having the reports printed in bulletin form and released to the technical press and printed in *Aera* as soon as they are prepared would be a great step in advance. This is now done by the American Railway Engineering Association, and the plan seems worthy of study relative to applying it to the work of the Engineering Association. But in order to make it effective there should be more certainty of continuity of committee membership and committee activity. As it now stands, all active committee work halts about July 1 and remains dormant until about Jan. 1. In other words, from five to six months are practically fruitless so far as committee work and study are concerned and the hardest work has to be done in the late spring and early summer when the heat and regular work of the members conspire against good work.

The writer calls attention to these matters in the hope that your columns will be utilized for the purpose of discussing means which may be adopted to secure greater and better results from the activities of the Engineering Association, as the work of this allied association affects practically all branches of the electric railway industry and every possible step should be taken to make its work of the greatest possible service to the member companies. R. C. CRAM,

Engineer of Surface Roadway for Receiver.

England's Method of Handling Railroad Labor Problems

THE British Railways were returned to the owners on Aug. 14, after having been under government operation since 1914. It is of interest to note the new method adopted by the owners and the labor organizations for handling labor problems. The plan involves a national wages board or board of final appeal, a central wages board, railway councils, sectional railway councils and local departmental committees. The plan applies to all employees in the transportation department from station masters and freight agents down, to all engineering and signal employees and to other employees outside the shops.

The National Wages Board is to deal with subjects relating to rates of pay, hours and working rules referred to it by the Central Wages Board. It is to be composed of six railway men, six employees and four public representatives, with an independent chairman appointed by the government. It is given twenty-eight days to reach a final decision on any subject. Strikes are not to occur during this period because of the dispute before the board.

The Central Wages Board contains an equal number of representatives from the employees and the railways and does the real work in adjusting labor problems. The Railway Councils are regional co-operative boards who deal with regional applications of national rules, etc. The Sectional Co-operative Councils are five in number for each regional council and deal with more restricted labor problems and represent different departmental groups in a given region. Local departmental committees are still smaller subdivisions of the regional organization, dealing with local rules and conditions in each department.

The keynote is equal representation in the subordinate boards of the employees and the railway operatives and the public is represented only on the national board. Regional and even departmental applications of national agreements are provided and this marks the great difference between the American and English method for handling railroad labor problems.

New Molding Material for Cast Welds

Blow Holes in Thermit Welds Are Eliminated by the Use of a New Molding Material and New Style Mold Boxes
The Material Is Furnished at Cost

A NEW GRADE of molding material for thermit welding has recently been developed by the Metal & Thermit Corporation, New York, which, as proved by extensive researches and practical experiments, when used in accordance with the regular thermit practice, will definitely prevent blowholes and assure sound welds. This new molding material has already been introduced in many of the larger railway shops. The new material, designated as "thermit molding material," is quite different from ordinary molding material, and in all thermit work either this or a substitute which has been tested and approved by the Metal & Thermit Corporation should be used. In view of the great importance of using this new molding material it is now being sold practically at cost.

The design of the new molding material is based on the theory that good silica sand will stand the heat of the thermit reaction very well and that the weakness in all molding material is the clay binder. Therefore, there should be as little clay as possible in the mixture, in order to make the mold more refractory and to increase its porosity. It is logical, therefore, that the use of a plastic clay has been selected instead of a fire clay, as formerly. The sand and plastic clay are ground together in a foundry pan or moller, with the intention of coating each grain of sand with a minimum thickness of clay. This has resulted in a good, clean molding material, which should be rammed hard in the mold, which will stand up well under the preheating flame and which is extremely porous to the gases generated in the mold, resulting in a sound weld with a very clean exterior. Although suitable molding material can be made by increasing the clay content slightly and mixing the clay and sand thoroughly by hand, it is not so good as that made with a smaller clay content in the foundry pan or moller.

The mixture now being used is composed of three parts clean, sharp silica sand (100 per cent of which should pass through a screen having a 0.03 in. square opening, and 40 per cent of which should be retained on a screen having a 0.012 in. square opening) mixed with one part Welsh Mountain plastic clay. These parts are first thoroughly mixed in the moller together with one-fortieth part glutrin by volume and sufficient water (one-twelfth part) to bring to the proper consistency. If mixed by hand, the sand and clay must be dried before mixing (care should be exercised not to subject the clay to a temperature higher than 400 deg. F.) and thoroughly mixed before adding the glutrin and water. The glutrin should be mixed with the water before being added to the sand and clay.

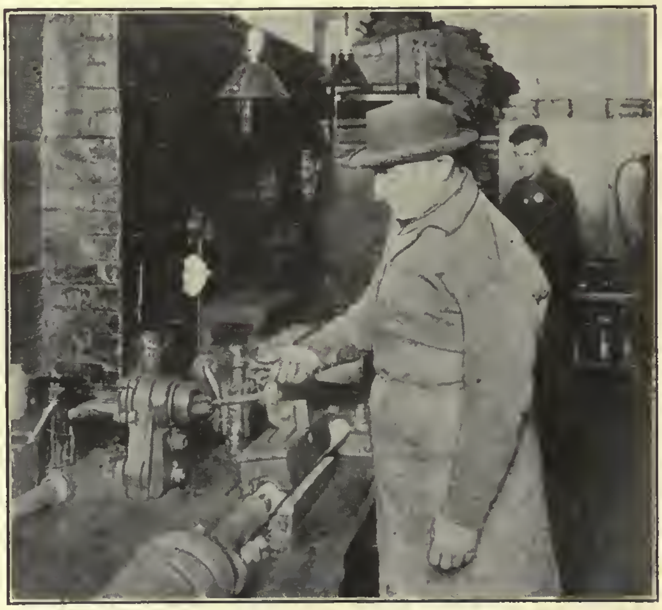
In case a plastic clay fatter than the Welsh Mountain be used, the mixing, of course, will have to be more thorough and less clay used. Welsh Mountain clay is being used in the present mixture because in carefully run tests it has proved to be the most refractory. The use of the new molding material necessitates harder packing next to the weld; in fact, the regular thermit rammer may be supplemented by the use, for instance, of a tool having an end ⅜ in. x 1½ in., so that the operator may be able to peen the sand next to the wax collar and the various patterns.

It is absolutely essential, in the production of sound welds, to be sure that no loose sand exists in the mold when the thermit steel is poured. This is why very hard ramming is advocated, also why it is most important to blow out all loose material from the interior of the mold by putting the preheating burner in the riser before the heating gate is plugged and to be sure that no sand is detached by the operation of inserting this heating gate. The burner should be removed from the riser before plugging the heating gate, because otherwise it may detach some sand which could not be blown out after the plug is in place. The heating gate plug should be thoroughly dry; and, if it has been carried in stock for some time, it should be warmed before using.

By perforating the side and bottom of the mold box, the escape of the gases which pass through the molding material is greatly facilitated. Holes ⅜ in. in diameter, spaced 3 in. or 4 in. apart, are sufficient. To facilitate the escape of gas from the bottom of the mold box, the mold should rest on blocks, not directly upon the foundry floor. As unnecessary molding material simply increases the resistance to the passage of gas, the mold box should be made as small as possible commensurate with safety. For example, in welding a 4-in. x 1-in. section, only about 4 in. of sand is necessary at all points, except, perhaps, on the pouring gate side. It is most important thoroughly to vent the mold box by forcing a rod or wire down at a number of points to within ½ in. or so of the collar. Care should be taken that these do not touch the collar because such vent holes will fill with steel and will therefore not facilitate the escape of gas.

Device for Installing Hose Fittings

THE accompanying illustration shows shop-constructed apparatus used for the inserting of nipples and couplings in air-brake hose at the Thirty-sixth Street inspection and overhauling shop of the Brooklyn Rapid Transit Company. Previous to the construction of this apparatus the nipples and couplings were inserted by placing the hose in a vise and pressing the metal parts into the rubber tubing by hand.



APPARATUS FOR INSERTING NIPPLES AND COUPLINGS INTO AIR BRAKE HOSE

The apparatus for holding the hose, as illustrated, consists of two clamping blocks, the upper one of which is hinged. The opening and closing of this clamp are accomplished by means of an air cylinder, which forms a part of the equipment of the company's cars and is used for the locking and unlocking of automatic couplers. This air cylinder is connected to the top clamping block by means of a lever and its operation opens up or closes the clamping portion. The part which fits around the hose is lined with canvas to prevent injury to the hose and also to provide increased friction for clamping. With the hose placed in position it is held clamped by turning an air cock, which admits air to the air cylinder. The nipple or coupling is then fastened to a threaded piston of another air cylinder and by the use of a brake valve air is admitted in sufficient quantity to force the fitting into the end of the hose. The pressure and speed are regulated to suit conditions. The air cylinder used for this latter operation was constructed in the shop. By the use of this apparatus one man can fit the couplings and nipples into a hose in a very short time and the job is thus rendered very attractive as well as providing an efficient means for doing this type of work.

Power-Operated Signals

A NEW type of signal motor has been developed in France and is now marketed by Tyer & Company of London. With this type of motor, which is being tried out on many English railways and is used on French lines to a large extent, the power to operate the motor is obtained from two sets of six Leclanché cells in parallel. Current is applied only when the signal is being lowered and the signal is held "off" by a small battery at the signal box, so there is considerably less consumption of power than is generally thought. The motor is situated on the signal post at any favorable location and takes up an incased space 15 x 12 x 12 in. deep. The mechanism is tested to lift 120 lb. The voltage of the motor battery is ten, the starting current is 2 amp., this gradually increasing to 3¼ amp. The resistance of the armature is 0.14 ohms and that of the field is 0.205 ohms. The motor is readily adapted to be operated from power supply mains by changing the winding slightly. A detailed description of the Tyer motor is given in the *Railway Engineer* for August, 1921.

The power-operated signal is being used to an increasing extent because of its many advantages in the protection of the apparatus associated with its application. The advantages for such signals are: 1. There is no strain on the signalmen as there are no heavy weights to lift. 2. The accurate "on" and "off" position of the arm is assured. 3. No adjustment of wire is needed to meet changes of temperature. 4. Fewer wires are present on the tracks for men to trip over or to be covered. 5. The distance from the signal box is immaterial and the signal may, therefore, be fixed in the best position for the driver's view. 6. There is a reduction in the number of working levers because the signal may be controlled by a switch providing the latter be interlocked with the relative stop signal.

With the power-operated signal the source of power is at the signal and a line wire is run from the lever in the signal box to the signal. The wire is connected to a switch on the lever in the locking mechanisms, and when, and not until, the lever is fully reversed a contact is made which electrically connects a small battery in the signal box. This battery operates a relay at or near the signal post and the relay, when operated, permits a current from the battery which operates the motor on the signal. The signal arm, when it has been lowered to the "off" position, automatically cuts off the motor battery from the motor, and the arm is held in the "off" position by an electrically operated brake. When the lever has been pulled to reverse, the first movement back to normal will break the contact on the lever and release the electric brake on the signal lever so that the signal will at once go to the "on" position. It is usual to employ an electric repeater, controlled by contacts operated by the signal arm, to indicate the condition of the arm.

A. R. A. Mechanical Division Will Not Meet This Year

Postponed Meeting Has Been Permanently Put Off, but Reports of Eight Committees Which Were to Have Been Presented at the Meeting Are to Be Submitted to Letter Ballot

AT A meeting of the Association of Railway Executives held in New York, July 1, 1921, it was decided that there should be no meeting of the Mechanical Division of the American Railway Association this year. A meeting was to have been held in Chicago, June 29 and 30, but it was postponed. This action was decided upon after the following resolution had been adopted:

"Whereas in view of the imperative need for the exercise of all possible economy, it is

"Resolved, That annual or special meetings or conventions of all organizations under the supervision of this body be indefinitely postponed or curtailed in every possible way."

Following the decision of the general committee of the Mechanical Division not to hold a meeting this year it was decided to submit through a letter ballot to the members the recommendations of the various committees which were to have been presented at the meeting in June. These reports include: (1) Specifications and tests for materials; (2) report on joint inspection of standard materials; (3) report of arbitration committee; (4) report on car construction; (5) report of committee on loading rules; (6) report on brake shoe and brake beam equipment; (7) report of committee on tank cars; (8) report on train brake and signal equipment.

The committee on specifications and tests for materials recommended a revision of the standard specifications for carbon steel axles for cars, locomotive tenders and engine trucks, also a revision of the present specifications for steel castings for cars and locomotives, combining these two into one specification. The committee further recommended that the association give serious consideration to establishing a definite time limit for revisons of specifications and other standards which will appear in the Manual, this limit to be preferably three years, during which no changes should be allowed except for reasons important to the interests of the association, and then only if the proposed changes received at least a two-thirds vote at the annual meeting of the division.

The committee on brake shoe and brake beam equipment reported that the subject of brake shoe key design and details involved in the fit of the shoe, head, face and key had been investigated and an examination of a large number of brake shoes on cars disclosed the condition of the keys being all the way down and still a loose fit. This indicated the desirability of a change in the key design. The committee submitted a new design of key with a suggestion that this be tried out for further consideration. The proposed key is thinner at the point, and has a somewhat greater taper than the standard key, so that it becomes $\frac{1}{2}$ in. thick at a point $3\frac{15}{16}$ in. from the end instead of just under the head. The drawing shows a tolerance of $\frac{1}{32}$ in. in thickness, which is a practical working limit if the key is drop forged or rolled.

Iowa Association Program

THE program for the mid-year meeting of the Iowa Electric Railway Association, to be held in Waterloo, Iowa, on Sept. 15 and 16, has been tentatively arranged to include the following main topics of discussion at the meeting.

A paper on "Transportation" will be presented by Maurice A. Welsh, superintendent Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa. Frank R. Grant, Westinghouse Electric & Manufacturing Company, Des Moines, Iowa, will present a paper on "Dipping and Baking Armatures." R. J. Smith, general manager and engineer maintenance of way Tri-City Railway of Iowa, will read a paper on "Laying and Maintaining Track." The subject of a paper to be presented by Herbert J. Connell, trial attorney Omaha & Council Bluffs Street Railway, Omaha, Neb., is "The Relation of the Claim Department to the Transportation, Track, Overhead and Mechanical Departments." A paper on the "Relative Maintenance Costs of One-Man to Two-Man Cars" will also be presented.

The exact place of holding the meeting has not yet been determined. This and further program details will be announced in a later issue.

National Safety Council

THE National Safety Council has decided to hold its annual convention in Boston, Mass., from Sept. 26 to 30. The national body recently received an invitation from the Boston organization, and after consideration agreed to make the Hub the scene of its meeting this fall.

The local safety councils in Massachusetts have just held a "safe roads" campaign in which several of the larger street railways took especial interest. H. B. Potter, assistant general manager of the Boston Elevated Railway, is president of the Boston branch of the Safety Council.

Nominating Committee Correction

DUE to error in transcription, the name of W. H. Heulings, Jr., of J. G. Brill Company, Philadelphia, was omitted from the list of the nominating committee of the American Association as printed in last week's ELECTRIC RAILWAY JOURNAL.

The full committee therefore consists of the following: J. H. Pardee, P. S. Arkwright, F. G. Buffe, W. A. Draper, E. C. Faber, Thomas Finigan and W. H. Heulings, Jr.

As noted last week, this committee is desirous of receiving suggestions from the members of names for the various offices to be filled. If the members assume that the executive committee of the future will be made up according to the revised constitution as proposed, there will be elected this year:

One president.

Four vice-presidents.

Six members at large from operating companies, with terms expiring, two in 1922, two in 1923 and two in 1924.

Six members at large from manufacturing companies, with similar terms.

One treasurer.

American Association News

T. & T. Subjects Committee

THE Transportation & Traffic Association announces the following as its subjects committee to report to the convention on subjects for the coming year:

G. T. Seeley, Pennsylvania-Ohio Electric Company, Youngstown, Ohio, chairman; J. P. Barnes, Louisville Railway, Louisville, Ky.; J. K. Punderford, the Connecticut Company, New Haven, Conn.; C. E. Morgan, Brooklyn City Railway, Brooklyn N. Y., and Edward Dana, Boston Elevated Railway, Boston, Mass.

The committee desires suggestions from the members at large so that its reports will be truly representative of live subjects in the transportation and traffic field.

Valuation Committee Report Ready

THE American Association valuation committee held an important meeting at association headquarters on Saturday, Aug. 27. The report of the committee was completed and it is expected that it will be available in pamphlet form previous to the Atlantic City convention. The committee has made some important recommendations in the report which will be discussed at the convention.

Those present were Martin Schreiber, Public Service Railway of New Jersey, Camden, N. J., chairman; W. H. Sawyer, E. W. Clark & Company Management Corporation, Columbus, Ohio; J. H. Hanna, Capital Traction Company, Washington, D. C., and W. H. Maltbie, United Railways & Electric Company, Baltimore, Md.

Engineering Subjects Committee

THE membership of the subjects committee of the Engineering Association has been announced as follows: L. V. Datz, American Cities Company, Birmingham, Ala., chairman; A. B. Stitzer, Republic Engineers, Inc., New York; C. H. Clark, Cleveland Railway, Cleveland, Ohio, and H. A. Johnson, Metropolitan West Side Elevated Railway, Chicago, Ill.

This committee is to report as usual at the convention on subjects for consideration during the coming year. The committee is asking for suggestions from the members at large to assist in formulating its report, so that subjects to be considered certainly will be those in which the members at large will be interested.

Entertainment Committee Ready

THE entertainment committee held a fine meeting at association headquarters on Saturday, Aug. 27. Under the direction of E. C. Faber, chairman, the committee prepared an entertainment program that will be sure to please the convention.

Some surprises are in store for members and the committee is to be congratulated on its originality in devising means for keeping everybody at the October convention happy.

Judge Paroles Gibson

AS WAS noted previously in these columns, the defaulting bookkeeper of the association, W. O. Gibson, was to present himself for sentence on Wednesday, Aug. 31. When he did so, Judge Rosalsky, who had been advised of Mr. Gibson's efforts at restitution, read from a New York statute dealing with such cases. From this statute it appears that the judge is given discretion to place the defendant on probation, in case the defendant has made restitution or efforts at restitution that satisfy the aggrieved parties. President Gadsden of the association was placed on the stand, and after stating the steps Gibson had taken to make restitution said he was willing for the judge to exercise his discretion and place Gibson on probation with proper restrictions.

The steps which Gibson has taken toward restitution are, first, to give a check to the association for something in excess of $5,800; and second, to make certain arrangements looking toward a settlement in the future of a substantial portion of the missing funds. This was apparently the maximum Mr. Gibson and his family could do, and it was considered advisable to place him on probation and allow him to make efforts to repay additional amounts, as he proposed.

Accordingly, Judge Rosalsky placed Mr. Gibson on probation for a period of fifteen years. He is ordered to report in person on the 12th of December of each year for fifteen years. He is ordered to report to the probation officer, either in person or by satisfactory communication, once each week, for a period of fifteen years. The court thus retains jurisdiction over the case during this whole time through the office of the probation officer.

Recent Happenings in Great Britain

More Evidence of Near Return to Normal in Railway Field—Glasgow Turns to the Bus—A. R. McCallum Quits the Underground

From Our Regular Correspondent

The railway and tramway undertakings are at last beginning to get over the results of the war. Possibly one cause of the great outburst of activity by the steam railway systems in the end of July and the beginning of August was the fact that the period of government control, which had lasted since the beginning of the war, was to come to an end in the middle of August. Then through the operation of the sliding scale wages have begun to come down in accordance with the fall in the official index figure of the cost of living, and coal is of course abundant since the miners' strike ended.

FOR the present holiday season the railway companies have offered passenger facilities better than any of the past seven years. Excursion trains and cheap tickets are in operation everywhere. The cheap fares, however, are only cheap by comparison with the present ordinary fares; absolutely, they are about the same as the pre-war ordinary fares.

Tramway facilities have also been increased, and at the time of the August bank holiday (which is a general holiday) more lavish services were run than for years past. The wages sliding scale for tramways was, however, more recently agreed to than in the case of the railways, so that the owners of the tramway undertakings have not yet begun to feel the benefit of lower wages. Within the last few weeks the index figure of the cost of living has ceased to fall—partly, at least, owing to the prolonged drought—and until it resumes its downward course wages will cease falling.

MOTOR VEHICLE IS POPULAR

Another striking development of the present holiday season is that of motor passenger vehicles. Last summer saw some activity, but now it may be said generally that all the most pleasant parts of England and Scotland are covered by services of motor omnibuses and motor coaches. The runs vary from an hour or two up to a duration of a week or more. The latter are of course organized tours. The main roads of the country are gradually being restored to good order, and more money is available for the purpose from the tax on motor vehicles. Petrol is abundant, and this form of holiday business is evidently profitable. In this connection it may be said that competition with tramways is only incidental, and of course tramway routes cover only a small proportion of the roads followed by the automobiles.

Hitherto the Glasgow Town Council has done nothing in the way of motor omnibuses, and has been content to work one of the most efficient and profitable tramway undertakings in the country. It is now proposing, however, to seek Parliamentary powers to operate motor omnibuses both inside and outside the city. Doubtless these vehicles will be auxiliary to and not competitive with the tramcars.

The British steam railway companies have had a set-back in an effort they made in the end of July to get general powers to carry both passengers and goods by motor vehicles on the public roads. For some time there has been under the consideration of Parliament a government measure called the railways bill—a long and complicated bill for meeting the post-war situation after the railways are freed from state control. It provides for the amalgamation of the railways of the country into a few great companies, and sets up a great deal of new government regulation. The railway companies brought forward a new clause for insertion in the bill to enable them to operate motor vehicles on the highways. The road transport companies and firms and the omnibus companies as well as the private automobile interests took alarm at the threatened powerful competition and a fight was expected, but just when it would have begun the Speaker of the House of Commons ruled the proposed clause out of order as being beyond the scope of the bill.

He laid it down that if such powers were to be granted it must be by separate legislation. Whether the railway companies will promote such legislation remains to be seen. Despite the outcry that has been raised against the railway companies' proposal, they have a good case for it in at least one direction. That is the transportation of goods for comparatively short distances. They convey the goods by road from the consignor to a railway station, load them into a train, discharge them at another station, and then take them by road to the consignee.

FREIGHT TRANSPORTATION COSTLY

Where the railway haul is not long, this is a slow and expensive process compared with what it would be if the companies could transport the goods by road direct from the sender to the receiver. Of course that is what the road transport companies are doing now, so that the latter got a fright. They are now safe—for the present at any rate. Should the railway companies make another effort to get the powers they want, they will also be able to contend that in very many districts they are the largest local ratepayers.

It is not surprising to learn that the London County Council has decided to promote no bill in the next session of Parliament to authorize the construction of additional tramways. In recent years the great bulk of such proposals have been rendered nugatory by the veto of the metropolitan borough councils. The highways committee of the Council also thinks that the Minister of Transport would report adversely on the schemes. The members consider that a remedy will not be forthcoming until there has been a complete and considered reorganization of the existing systems of passenger transport in the London area. The Council has already represented to the government the necessity of legislation to provide for the unified operation of local passenger transport undertakings in Greater London. Meantime the Council and the London General Omnibus Company have arranged an extension of the through-booking scheme between the tramcars and the omnibuses.

POWER-SAVING DEVICES BEING USED

The London County Council is now adopting experimentally on twenty-two cars a power-saving device which is reported to be in use on certain American tramways and is employed by the Metropolitan Electric Tramways in Middlesex. Its purpose is to grade the economy of the motormen in their use of propulsion current.

It is proposed the Birmingham City Council should seek powers in the next session of Parliament to run trackless trolley cars over any tramway route in the city. An example is given of a particular tramway which needs reconstruction. To reconstruct it would cost £95,000 at present prices, and the service would be run at a loss. To install the railless system would cost £54,000 less and there would be an estimated profit of £3,000 a year.

The ballot of the members of the Amalgamated Engineering Trade Union resulted in a majority in favor of accepting the employers' proposal for reductions in wages. Thus a strike has been averted. Reductions have been accepted by other unions also, so that there is some hope of the country being placed on an economic basis.

The dividends declared by the London underground railway companies for the half year ended June 30 last show material improvements as compared with recent half years, attributable doubtless to the increased fares. The London General Omnibus Company has also done better.

MR. MCCALLUM RESIGNS

A. R. McCallum, who two years ago, along with other officers of the London underground railway companies, visited the United States to make a study of electric traction conditions there, has resigned his position as chief assistant to the mechanical engineer for the underground railways in order to take up an appointment with C. P. Sandberg Brothers, consulting engineers, who are well known in America as well as in this country. Mr. McCallum, who is a B.Sc. of London University and was a pupil with Dick, Kerr & Company in their Preston works, has been assistant mechanical engineer to the underground railways for nine years.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Another Week Lost

Discussion at New Orleans Believed, However, Not to Be Entirely Without Benefit

The City Commissioners of New Orleans have frittered away another week in conference with City Attorney Kittredge without result. Meanwhile, testimony in the street railway case, in the Federal District Court, involving the right of the city to interfere with the receiver in the collection of an 8-cent fare, has been postponed by Special Master Chaffee, from Aug. 20 to Aug. 29. Postponement was made by Mr. Chaffee in the hope that the city and the New Orleans Railway & Light Company might be able to reach an agreement by compromise out of court.

The Ballard report, on valuation and rate making, was submitted to the Commission Council on Aug. 24 by Commissioner Maloney of the Department of Public Utilities, with the indorsement: "Respectfully submitted without comment."

Mayor McShane has at last taken a fling at solving the railways problem. He thinks his plan will make for the settlement of the matter, with some modifications, perhaps, by the city. Briefly stated, the McShane plan offers to help the railways secure $5,000,000 of new money, said to be needed to replace present antiquated equipment, and allows the company an 8 per cent return on that amount. The Mayor is of opinion, however, that the property is worth only $40,553,500 and not $44,700,000, as fixed by the utility experts, called upon by the city to estimate its value, the last of whom was Mr. Ballard.

So as not to appear hostile to the company, Mayor McShane supplements these allowances in his proposed plan of settlement, with the further allowance of an 8 per cent return upon the difference between his estimate of the value of the property, namely, $40,553,500 and that fixed in the Ballard report, viz: $44,700,000, or $4,156,500. This means an 8 per cent return on $4,156,500, in addition to the 8 per cent return which he is willing to allow on the $5,000,000 of new money to be borrowed. On the balance of the securities of the company the Mayor says he is only willing to allow the interest called for on the bonds, which varies from 4½ per cent to 7 per cent.

Under this plan Mayor McShane declares the company would be allowed a return of $2,791,915 a year, as against a return of $4,031,560 called for under the Chappelle plan, and $3,129,000 and $400,000 new money, called for under the plan of the Committee of Forty.

Commissioner Murphy, of the Department of Finance, whose plan for the settlement of the tangle more nearly approaches that of the utility experts of national reputation, has been attending the daily executive conferences and has formed his own conclusions as to the prospects of these "talks" leading to a settlement. As a result he is insisting upon an immediate adjustment of the matter. In a published statement, Commissioner Murphy said:

> If the surplus is protected and the rates of interest on all of the new company's securities are properly fixed by the Commission Council (which is one function of the rate making body) I am firmly of the opinion that an 8 per cent return on the agreed valuation offers greater protection to the public for constantly increasing and expanding the service without increasing rates and fares.
>
> I stand willing, however, to accept any rate of return which will result in settling this problem along the lines of sound and correct principles. I believe, however, that no settlement, no matter how just or sound, can succeed without intelligent public understanding.

A conference was held on Aug. 25 and 26 by Mayor McShane and the members of the Commission Council with the executive committee of the Citizens' Committee of Forty. The meeting took place in the directors' room of the Hibernia Bank & Trust Company. R. S. Hecht, president of the bank, who was chairman of the conference, expressed the belief at the close of the meeting that the railway tangle was nearing a settlement, but beyond making this statement neither he nor the parties to the conference would disclose what had transpired. It is understood that a valuation of approximately $44,700,000 was tentatively agreed upon by a majority of the conferees. Another meeting scheduled for Aug. 27 was called off.

Commissioner Maloney of the Department of Public Utilities, when asked whether the Ballard report or a report of some kind placing a valuation upon the property with an adequate measure of return, would come up for discussion and consideration at the Aug. 30 meeting of the Council, replied that nothing in this direction would be attempted until some agreement had been reached as to a fair valuation of the property. Unless a compromise as to valuation and rate of return was effected with the railway company, the matter would be left to the courts for settlement. The outcome would be unsatisfactory in that event, to both the railway and the people.

Special Master Chaffee has again consented to postpone taking testimony until Sept. 5. This is taken to show that nothing was accomplished during the week at the daily conferences attended by the Mayor, the City Commissioner, the City Attorney and such members of the executive committee of forty as dropped in from time to time.

Another Municipal Route

First of Important Crosstown Lines in Detroit Placed in Operation by City

The first of the big crosstown lines planned as part of the municipal system of street railways in Detroit, Mich., was put into operation on Aug. 25, when cars were started on the Charlevoix-Buchanan route over a distance of 10½ miles with a single track mileage of 21. This car line now serves districts not touched by car lines heretofore. A portion of the line had been in operation previously. One-man safety cars are now being operated, but it is intended to replace part of these cars with Peter Witt type cars under contract to be delivered in the fall. At the same time the Van Dyke Avenue line was put into operation giving service to a residential section which had been without car service. The Van Dyke line is a tributary to the new crosstown line.

On the day service was started on the new line the suit started last September by residents of Eliot Street to enjoin the construction of the municipal line on their street, one of the thoroughfares traversed by the new crosstown line, was dismissed by Judge Dingeman in the Wayne Circuit Court.

The city now has cars operating over 32 miles of lines. The short sections which served a purely local patronage are now connected into a network of lines serving the east side. The crosstown line connects this system with the west side of the city and further service will be installed in a few days by opening up the Moran-Palmer lines.

It is further reported that other extensions of the municipal lines will be announced as soon as the day-to-day agreement lines constructed by the Detroit United Railway are taken over by the city, after the report of the Board of Arbitration which is to convene again on Sept. 6. The effectiveness of the city lines depends to a great extent upon the Fort Street and Woodward Avenue lines now operated by the Detroit United Railway, which are still the subject of controversy and which the city needs to reach the heart of the city.

Future Service to Be Discussed

Although the Ottawa (Ont.) Electric Railway has two more years under its contract to furnish transportation service to the residents of the city, agitation has been renewed looking toward the enactment of a service-at-cost arrangement. The Board of Trade is making provisions for a general field day some time in September, when the whole question of future service by the railway will be discussed.

Service Resumed at Des Moines for State Fair

Company Guaranteed Against Loss—Terms of Proposed New Franchise Grant Now Available

The most important development in the railway situation at Des Moines, Ia., during the week ended Aug. 27 was the temporary resumption of railway service after a three weeks' shutdown, to continue only for the period of the Iowa state fair. The resumption of service came as a result of a petition filed with Judge Wade of the federal court by attorneys for the State Agricultural Society. The petition was not filed until after officials of the Agricultural Society had made a trip to Chicago to go over the situation with Mr. Harris and his associates.

Although bus men had made emphatic claims as to their ability to take care of the fair crowds, officials of the fair, even with assurance of supplemented service of shuttle trains on the Rock Island Railroad, were doubtful of the outcome and fearful that with inadequate transportation facilities attendance at the fair would be seriously curtailed.

In filing their petition with Judge Wade the fair officials agreed to guarantee the Des Moines City Railway against financial loss during the period of the fair. City officials took no part in either the filing of the petition or the hearing upon it.

EMERGENCY SERVICE ONLY

Judge Wade acted solely upon the emergency presented by the fair officials and in making his order for the temporary resumption was specific that it would cover only the period of the fair and that service was to cease on Sept. 2. Officials of the railway were agreeable to the proposition and service was resumed on the afternoon of Aug. 26. The service was restored on exactly the same basis as was being given at the time it stopped on Aug. 3. Fifty-nine cars are in service and owl cars are being run.

Immediately upon the resumption of railway service the buses lengthened their routes to take in the railway loop downtown. When the railway service was stopped buses shortened their routes in the downtown section. No attempt was made by the Des Moines City Railway to give special service to the fair grounds, only six cars being operated on that line. The main desire of the fair officials in securing the return of the cars was to insure Des Moines people being transported from their homes to the downtown section. Buses are handling the bulk of the business to the fair grounds, almost any vehicle that would run being converted into a so-called truck. One transfer company has put several of its motor driven moving vans into service to and from the fair grounds.

Judge Wade's order for the restoration of service during the period of the fair is as follows:

> A strong appeal has been made by officers of the state and the directors of the department of agriculture for the state of Iowa, that an order be made providing for street car service during the state fair. The bondholders have been consulted and in view of the importance of service during the fair, not only to the people of Des Moines but to the people of the state, it is my judgment that the cars should be operated.
>
> Of course if there should be a deficit in such operation it must be paid by some one. I have no power to require the bondholders to pay any deficit and therefore I only have power to authorize service on condition that if there should be a deficit in actual operating expenses it shall be paid by the agricultural association or some others. It is my hope that with the demand for service during the days of the fair enough of money can be collected for fares to pay actual expenses. I am advised that those interested are willing to guarantee any loss in operation.
>
> Although it is impossible to establish more than the minimum service that was in operation at the time of suspension and to avoid any possible misunderstanding the order is made positive that such service shall immediately suspend upon the close of the fair and remain suspended under the order heretofore made pending foreclosure.
>
> It is ordered and adjudged that the receivers shall as soon as practicable restore the service as near as practicable to that which was suspended under order of this court on Aug. 2, 1921, such restored service to continue only until the close of the state fair and not later than Sept. 2, 1921.
>
> This order is conditioned upon a guarantee to be approved by the receivers, by some individual or organization to pay to the receivers any deficit in actual cost of putting the cars in operation and operating the same as herein required.

Des Moines bus operators began a campaign of "education" for the people of Des Moines on Aug. 25 with a meeting at the Grant Club of representatives of improvement leagues, women's clubs, trades unions, Rotary, Kiwanis and Lions' clubs, and all members of the City Council. This meeting was the first of a series which is to be held to sell the bus idea to the people of the city. C. W. Lyon, attorney for the Motor Bus Association, was the speaker at the meeting and advised his hearers that with an assurance from the City Council of a lease of life the bus owners would within ninety days furnish service entirely adequate, and that an organization capitalized at $1,600,000 could be formed to finance operation.

Mr. Lyon explained that the present emergency is an entirely unfair test for the buses and that the people could not expect men with $300,000 invested to provide the financial backing necessary to establish proper service when they had no assurance that they could continue to operate. In answer to a question he claimed that provision had been made which would insure keeping the streets open when snow was on the ground.

The promise of the bus men, in the event they are awarded a franchise grant, was briefly as follows:

> Furnish necessary motor buses within sixty or ninety days from date of signing the contract.
>
> Operate at a 5-cent fare for one continuous ride.
>
> Carry children under twelve years at half fare.
>
> Carry high school children for 2½ cents between hours of 7:30 a.m. and 4:30 p.m.
>
> Carry children under six years free when accompanied by parent.
>
> Carry policemen and firemen free.
>
> Operate hourly owl service at a 10-cent fare.
>
> Comply with insurance and bonding laws.
>
> Operate on light and heavy lines as considered necessary.
>
> Comply with speed regulations.
>
> Pay reasonable street repair taxes.
>
> Standardize buses.
>
> Welcome inspection looking toward proper heating, lighting and sanitation.
>
> Maintain proper garage and repair shops.
>
> Make convenient routing schedules.

Bus operators claim there are now approximately 110 buses in service and that during the time the street cars were out of service the buses were carrying more passengers per day than the Des Moines City Railway did during the month of July.

A number of buses from other cities have been shipped in during the past week, but on the other hand some of the buses which have been in service and which were pronounced the most satisfactory of those running have gone out of service because of the need for repairs.

Negotiations between the Des Moines City Railway and the special committee from the Retail Merchants' Association looking toward a new franchise to end the Des Moines railway difficulties were expected to be resumed early in the week ended Sept. 3.

F. C. Chambers, general manager and operating receiver, who at the request of the merchants' committee returned to Chicago for further conference with A. W. Harris relative to certain features of the franchise, returned to Des Moines on Aug. 26, but did not bring the completed draft of the franchise with him. The draft had not been received on Aug. 27, but was expected by early mail on Aug. 29.

NEW FRANCHISE GRANT APPEARS

After the franchise as submitted by the Harris interests is threshed out with the committee, it will then be presented to the City Council. Mr. Chambers said to a representative of the ELECTRIC RAILWAY JOURNAL on Aug. 27 that the provisions of the franchise would not be made public until after the draft had been presented to the City Council.

The draft which will be under consideration during the week just ended has been changed considerably from the one submitted to the Merchants' Association committee ten days ago.

After being sifted and favorably passed upon by the special committee of the Merchants' Association the draft of the new franchise for the Des Moines City Railway was presented to the City Council on Aug. 31. At the special session of the Council it was ordered referred to the corporation counsel for advice and it is expected to be back in the Council's hands for first reading by Sept. 2.

There must be three readings by the Council and then if favorably acted upon the measure must be upon file for one week before election is called. It must then be advertised for thirty days before being voted upon by the people.

The principal provisions of the franchise are the sliding scale of fares to start at 8 cents straight, to be lowered or raised as the financial condition of the company warrants. Before the fare is reduced from 8 cents, $6,000,000 in accrued interest and debts must be met. It is proposed to amortize this sum over a five-year period. No dividends will be paid on the common stock until fare has been lowered to 7 cents, when 4½ per cent will be paid. If the fare goes below 5 cents 6 per cent will be paid.

Provision is made for reducing fares as earnings warrant, to ten tickets for 75 cents, ten for 65 cents and ten for 55 cents between reductions so as to even the fares mentioned above. Protection from bus competition is provided by a clause which prevents buses from discharging passengers within 1,000 ft. of car track unless passengers have entered the bus at a distance greater than 1,000 ft. from the tracks.

Children's fares during specified hours of school days are to be 2½ cents. Regular children's fares are to be half of the adult fare. The owl car fare is to be 10 cents. One-man cars are to be allowed. The railway will be permitted to operate a supplementary bus system.

All disputes are to be settled by an arbitration board appointed by the Iowa Supreme Court to consist of three district judges chosen from outside Polk County. In the event the franchise is passed the power facilities will be increased and 132 cars will resume service.

Indications are that the franchise will have the united support of the business and commercial organizations.

The City Council on Aug. 31 renewed for a period of one year the bus licenses which expired on Sept. 1 on condition that they may be revoked at the will of the Council.

Railway Contends Commission Has Jurisdiction

That the Michigan Utilities Commission should be the one to judge and not Judge Cross of the Ottawa County Circuit Court is the opinion of the Michigan Railway as expressed in a hearing on Aug. 29 of the injunction proceedings brought by the city of Holland and Park township against the Michigan Railway. The court has reserved decision.

The arguments submitted were on an order to show cause in the case of the city of Holland against the Michigan Railway to prevent the railway from raising its rate of fare from 15 cents to 35 cents between Macatawa and Holland in alleged violation of franchise agreements. Holland City and Park township were represented by City Attorney Charles H. McBride of Holland.

The suit was the result of the Michigan Railway's boost in fares to 3 cents a mile granted by the Michigan Utilities Commission. It is claimed under the franchise held by the Michigan Railway and under an agreement with the city of Holland that the city fares are fixed at 5 cents and rates between Holland and Macatawa at 15 cents for the round trip.

The hearing was to determine whether the Michigan Railway should be permitted for the present to collect a 35-cent fare between Holland and Macatawa.

Saginaw Has Bus Offer

Company from Detroit Makes Proposal, but Wants Practical Assurance Against Possible Loss

Officials from the Wolverine Transit Company, Detroit, have presented to the city of Saginaw, Mich., through the Council and directors of the Board of Commerce a plan whereby Saginaw is to be given high-class motor bus service on streets formerly traversed by cars of the Saginaw-Bay City Railway, which suspended service three weeks ago when the company was placed in bankruptcy through a petition filed in the United States district court for the eastern district of Michigan.

The transit company men offered to invest $90,000 as a down payment for thirty motor buses, the Board of Commerce, city government, or some other organization to take it upon itself to sell 15,000 books of 240 tickets at $10 a book. They also offered universal transfers, indemnity insurance, limited to $10,000 for one person or $30,000 one accident. Before they will make any effort to secure the buses the promoters want the tickets disposed of and the money retained by a trustee to be appointed by the city or the Board of Commerce to be used to make the final payment on the buses. According to the plan, the trustee will be given a mortgage on all the equipment to assure faithful performance of the contract and to assure that they will abide by the necessary rules and regulations to govern schedules, rates of fare, etc.

The Council as usual after hearing the proposition called in the commerce directors and then gracefully slipped out from under. It was a case of good politics with them so the voters would not blame them for any poor service which might result if Saginaw has its usual severe winter. The commissioners believed the Board of Commerce could handle the proposition better than the city's duly elected representatives.

At this time it is known what the commerce body will do in the matter, but if the members can raise the $150,000 advance fares it is expected that the bus company wlil go through with its part of the program. In the event that they fail in giving the necessary service, and decide to quit operations, the trustee can foreclose the mortgage and then the city will have the buses to operate.

The transit officials did not ask to have the jitneys restrained from operating on the streets asserting they could get the business because of the class of their equipment and the service they proposed to give.

Those present at the meeting almost to a man asserted that not in the history of the street railway had service been on such a high plane as during the last year, but at no time did the Council or the Board of Commerce ever make any effort to sell tickets in advance to help the electric road.

Residents have now begun to realize the railway officials were sincere when they said they had to have additional compensation with jitneys eliminated or they would be forced to suspend for good and the friends of the railway are predicting that the electric cars will not operate again until the people get a real taste of what it means not to have street cars.

Municipal Railway Has Competition from Eighty Buses

With every indication that the various jitney interests in the city of Seattle, Wash., intend to carry their legal battle for existence and reinstatement to a finish, city officials are preparing to do everything in their power to terminate as soon as possible the protection to the sixty-five buses owned and operated by members of the Sound Transit Company and those operated by the company itself. All others have been off the city streets for nearly two weeks, with the exception of six, which are being permitted to run as feeders to the Seattle Municipal Railway in the district north of Cowan Park, where there is no railway service.

The Sound Transit Company's buses, however, are permitted to operate without interference of the city until the State Supreme Court decides whether it will grant a rehearing of the McGlothern suit, in which the temporary injunction against the city was obtained, and under protection of which the buses are operating.

Officials are preparing, if possible, to prevent continuance of the McGlothern temporary injunction if the jitney interests should carry their litigation to the Supreme Court of the United States.

The Sound Transit Company is now operating nine jitneys in addition to those owned by the sixty-five protected intervenors in the McGlothern suit, making a total of approximately eighty buses operating in the city.

Pasadena Would Curb Jitneys

The Pasadena Chamber of Commerce is in favor of an ordinance forbidding the operation of jitneys on electric railway routes, the establishment of an auto feeder by the Pacific Electric Railway, the granting of universal transfers and a 5-cent fare throughout the city. These sentiments were voiced recently in a communication to the Board of City Directors embodying the recommendations of the Chamber's committee on transportation. This committee has been at work on Pasadena's transportation problems for some time now. The matter will be considered again at some future date.

$250,000 Terminal to Be Built in Salt Lake City

Decision has been made to build a joint terminal of the Bamberger Electric and the Orem Railroads, and the work of erecting the first and most important unit of this interurban terminal, at the corner of South Temple and West Temple Streets, Salt Lake City, Utah, will begin within a short time. The architects, Young & Hansen, have been directed to proceed at once to the formation of detailed plans and specifications upon which bids can be prepared for contractors.

Tentative plans call for the expenditure of more than $200,000, including the cost of the excavations and cement work already completed. The building will probably be of steel and cement construction, with a frontage on West Temple Street of 192 ft. and a South Temple Street frontage of nearly 100 ft. The building will be three stories in height, and the ground floor will be set apart for stores and station room, while the upper floors will be devoted to offices for the electric roads and for other tenants.

The site of the present temporary terminal will not be needed for the new building and will continue to serve as a station until the work is completed.

Service at Cost Rejected

The City Council of Vancouver, B. C., rejected, on Aug. 22, the proposed service-at-cost franchise covering the railway, light, power and gas services of the British Columbia Electric Railway. The matter was shelved for six months, but there is nothing in the way of opening fresh negotiations.

The company is now at liberty to reinstate its application to the government of Canada for a Dominion charter, bringing it under the jurisdiction of the Board of Railway Commissioners, action which public bodies generally have approved.

The rejection of the franchise can be attributed to criticism by citizens generally and the lack of any feeling that a franchise was necessary. The fares under the present franchise are 5 cents, but the company is allowed by special permission of the city to charge 6 cents until July 1, 1922.

Seattle's Mayor Favors Trolley Bus

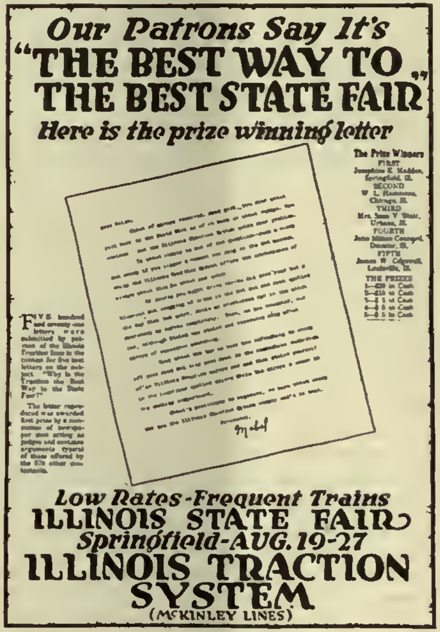
In a letter to the City Council recently, Mayor Hugh M. Caldwell recommended the use of the trackless trolley for First Avenue and First Avenue South, replacing existing street-car tracks, and obviating necessity of large expenditures for new rails in connection with the contemplated paving there. Mayor Caldwell said:

> According to our last street railway report, it is costing us about 28 cents a mile for our street car system. If these figures (18 cents a mile for the trolley bus) are correct, you can see that there would be quite a saving by installing the trackless trolley on First Avenue. The cost of installing the trackless trolley on First Avenue would be much smaller than in the case of a new line or extension, for the reason that the trolley poles and cross wires and one trolley wire each way are already in place.

The estimated cost of renewing trackage on First Avenue from Pine to Atlantic Street is $200,000. That amount has been included in an extension ordinance now pending in the City Council for betterments to the Municipal Street Railway.

Best Way to Fair—Traction

The best way to the best state fair is by electric railway. So think five lucky prize winners of a recent letter-writing contest on "Why is the traction the best way to the best state fair," started by the Illinois Traction System, Peoria, Ill. The champions of the railway had to rhapsodize in not more than 200 words and the winners found it difficult with that limitation to give sufficient praise to the electric carrier. The contest closed on July 31. It attracted great attention. Hundreds of letters from Illinois flooded the contest department, while many were received from states far off. The first prize was won —yes, by a woman, Miss Josephine K. Madden, Springfield, Ill. A woman always knows a good thing—a street railway.


Our Patrons Say It's
"THE BEST WAY TO THE BEST STATE FAIR"
Here is the prize winning letter

Low Rates-Frequent Trains
ILLINOIS STATE FAIR
Springfield-AUG. 19-27
ILLINOIS TRACTION SYSTEM
(McKINLEY LINES)

PRIZE-WINNING LETTER ADVERTISEMENT

Reduced Wages in Muskogee.—A 10 per cent wage reduction was put into effect on the lines of the Muskogee (Okla.) Electric Traction Company. As the scale now stands it is the same as it was a year ago. Since last spring traffic on this property has fallen from 350,000 to 240,000 a month. Though the fares were increased to 8 cents last year, Manager Cutlip has announced that the revenues have fallen off about 40 per cent.

James Dalrymple, manager of Glasgow Tramways, and R. J. Howley have been called in as experts to advise the Croydon Town Council as to the future of their municipal tramways.

Wages Adjusted on Seattle Municipal Railway

All wage differences between the trainmen of the Seattle (Wash.) Municipal Railway and the City Council were amicably settled recently when the budget committee changed the classification of motormen and conductors and granted them the same monthly compensation as that paid to policemen and firemen. This action was taken at the request of the trainmen, representatives of whom protested against the proposed 25-cent cut in wages of railway employees previously agreed upon by the Council. The plan adopted will work a reduction in the railway payroll, but not so large a one as the original 25-cent flat decrease would have effected. With the $10 deduction already made in the salary of firemen and policemen, trainmen will now receive the following rates of pay: new men, $135 a month; after one year's service, $145; after two years, $150; and after three years, $155.

Figures compiled by D. W. Henderson, general superintendent of the railway, show that a saving of only $60,254 a year will be effected in payrolls of the railway by placing the trainmen on the same salary basis as firemen and policemen, instead of the daily scale of from $4.75 to $5.25 now in effect. Mr. Henderson's figures show that under the present day wage scale, trainmen receive 59.375 cents an hour on the $4.75 basis, and 65.625 cents an hour on the $5.25 day scale. Under the new schedule they will receive 56.250 cents an hour, at $135 per month, as beginners; 60.417 cents an hour at $145 after one year; 62.5 cents an hour at $150 after two years, and 64.583 cents an hour on the basis of $155 a month after three years.

The actual payroll of the trainmen under the day wage is now $88,905 a month; under the new monthly schedule it would be $86,432 a month, a decrease of $2,476, or 2.785 per cent. The total payroll per year under the present scale is $2,163,449, and on the monthly salary basis it will be $2,103,195, or a decrease of $60,254. The new wage scale becomes effective in January, 1922.

Wheeling Men Accept Wage Cut

The employees of the Wheeling (W. Va.) Traction Company have accepted a wage reduction of 10 per cent, and the company has abandoned its one-man cars, which were placed in operation following the refusal of the men at first to accept the reduction. The reduction in part was accepted at the third vote. Last spring, when the wage agreement expired, the company insisted on a 10 per cent cut. The men flatly refused. The case went to arbitration and the board's finding was in favor of the men. The company, bound by the decision, then asked the men to accept voluntarily the 10 per cent reduction in wages. When the men first refused the company placed one-man cars in operation on the interurban lines.

Bus Service Unreliable After Trolley Quit

The city authorities of Bartlesville and Dewey, Okla., have joined in a petition to the State Corporation Commission asking it to assume jurisdiction over automobiles and jitneys operating on the hard surfaced highway between those two cities, a distance of about 4.5 miles.

Formerly an electric railway operated in Bartlesville and an interurban line to Dewey. Jitneys were permitted to compete with the railway and it was compelled to ask for higher fares. In July, 1918, the commission raised its fare to 7 cents between points in the city and its environs, and 14 cents between Dewey and Bartlesville. The jitneys then cut their fare to 10 cents. Unable to meet this competition the railway, about two years ago, was compelled to suspend operations. Since that the citizens of Bartlesville and Dewey have had to rely on automobiles and jitney service.

The mayors of the two cities, joining in the petition, state that between 250 and 300 people, who live in Bartlesville, work in Dewey and a similar number, who live in Dewey, work in Bartlesville. These people require regular and responsible transportation operated at certain periods. The petitioners state that so many automobiles are engaged in transporting passengers that none can afford to run on schedule and give adequate service and that, on this account, citizens are greatly handicapped and placed at large expense and great inconvenience.

The petition asks the commission to assume regulation of jitneys, to authorize one or more responsible individuals or corporations to operate automobile lines upon regular hourly schedules, to require license fees and place the owners of the lines under bonds for $1,000 and to make them responsible for loss of life or property, and to limit the maximum fare to 25 cents.

The commission, as yet, has never assumed jurisdiction over jitney traffic in Oklahoma. A date for the hearing of the case has not yet been set.

Interborough Employees Buy Homes

Interborough Rapid Transit employees are evidently solving the housing problem in their own way. According to a recent announcement of the United Citizens' Home Committee, members and directors of which are Interborough employees and whose object is to obtain property for the erection of homes for its 14,000 members, forty-five lots on Bronxwood Avenue, between 229th and 231st Streets have been purchased.

According to S. H. Kowitt, secretary of the committee, the lots will be distributed among members of the organization, and, following out the co-operative arrangement, each member interested in the enterprise will pay 25 per cent of the cost of the building and will own his lot outright. Each house will contain five, six or seven rooms. The cost of construction is placed at $800 a room.

The United Citizens' Housing Committee was incorporated under the laws of New York State January last.

Property Owners Assume Cost of Paving

In an order issued on Aug. 25 the Wisconsin Railroad Commission has required the Milwaukee Electric Railway & Light Company to extend its double track on Center Street, Milwaukee, from Sherman Boulevard to Fifty-first Street, a distance of about one-half mile. The commission points out in the order that in reaching this determination it is acting on the inference from the facts presented that the company will not be held to the usual track area paving cost demand, since contracts for the paving of the street have been let and the abutting property owners have already been assessed for the entire cost of the paving exclusive of street intersections.

The commission admits that the immediate prospective revenue from the extension in question would hardly warrant it in ordering the extension, were the company under obligation to meet the usual requirements with respect to paving. The work on the extension is to be completed on Dec. 1, 1921.

The extension was petitioned for by the city of Milwaukee and a hearing in the case was held on July 5. The city then submitted general evidence regarding the growth and development of the neighborhood to be served by the proposed extension and the company submitted, among other data, estimates of the cost of construction and operating the extension. The proposal was made that instead of constructing the track extension requested, the service be supplied by means of trackless trolley.

Estimates showing the comparative cost of constructing and operating the two types of service were submitted by the company. While the commission thought that the trackless trolley has an important field and hoped to see a fair trial of this type of operation in the near future, it was not convinced that the test should be made at this point. It said in this conection:

> We believe the trackless trolley has an important field and hope to see a fair trial of this type of operation in the near future, but we are not convinced that this test should be made at this point. The trackless trolley has not been demonstrated in this vicinity or under conditions similar to those existent on Center Street. If it should not prove satisfactory, the pavement would have been laid and the cost of constructing the tracks and cutting through this pavement would be enormously higher than the cost of constructing them now.
>
> Furthermore, it is expected that the tracks on this part of Center Street will be connected up with the tracks east of the Chicago, Milwaukee & St. Paul Railway after the tracks of the latter have been raised and the Center Street Subway completed. Center Street will then become a long cross-town line and there may be need for its extension yet further west. The construction of the tracks can now be made in advance of the pavement at a minimum of expense to the railway and we feel that under all the circumstances the experiment with the trackless trolley should not be made at this point.

News Notes

Aquatic Sports Provided by Railway.—The Charlottesville & Albemarle Railway, Charlottesville, Va., has built a swimming pool, 300 ft. by 90 ft. adjoining Jefferson Park. The pool cost $20,000 and has added greatly to the traffic which is being handled on the Jefferson Park line.

City Seeks to Recover Damages.—The City of Covington (Ky.) has brought suit against the South Covington & Cincinnati Street Railway Company, to recover $18,950 for the resurfacing of Madison Avenue between the tracks. This is the first step in a legal battle to determine whether the traction company is liable for the cost of this improvement. The city contends that the contract with the traction company requires that they pay for the maintenance of the street between the tracks.

Intensive Campaign for Business Successful.—The Minneapolis, Northfield & Southern Railway, Minneapolis, Minn., made a 202 per cent increase in freight business in July, 1921, over July, 1920. W. R. Stephens, assistant to the president of the road announced. Of this increase, 66 per cent was in new milk business. Passenger business of the railway showed a gain of 39 per cent in the same time. Mr. Stephens said the gain was due to increased service, the organization of a freight department and "going after the business." Since July 17, passenger volume has been benefited by the reduction in the price of the fare to 2½ cents a mile.

Bus Rights Should Be Only Temporary.—The Philadelphia (Pa.) Rapid Transit Company has explained its policy with respect to the building of an extension to the plant of Sears, Roebuck & Company. It wants any rights which may be granted for the operation of buses between the plant and its lines made for only a temporary period. Some months ago the railway applied to the city authorities for a franchise on the boulevard from Ramona avenue to Old York road. While it recognized that transportation service was needed it realized that for many years such service must be rendered at a loss to the operating company. The ordinance introduced in Councils at the suggestion of the company, was so amended by Councils that when passed and signed by the Mayor its terms were impossible of acceptance. While the matter is in this state the company feels that such certificates as are granted by the Commission should be temporary in their nature and subject to cancellation when and as adequate transportation facilities are provided by railway in co-operation with the city.

Financial and Corporate

Appointment of Receiver Asked for I. R. T.

Creditor With Claim of $57,074 Seeks to Keep Lines Intact—Equipment Debt $3,000,000

The American Brake Shoe & Foundry Company has filed an equity suit in the United States District Court at New York asking for the appointment of a receiver for the Interborough Rapid Transit Company. Action was taken shortly after the stock market closed on Aug. 27.

Claiming $57,074 long overdue, the foundry company declares the Interborough has more than $3,000,000 in floating indebtedness besides other huge outstanding obligations. The $3,000,000 debt, including materials, equipment, taxes and supplies, the complainant states, is now overdue and the Interborough unable to pay.

The complainant declares that certain creditors are pressing for payment, that suits threaten, that executions may be levied on the equipment and property of the defendant, and that there is grave danger the Interborough may thereby be deprived of the use of its equipment and rolling stock. It also is alleged that for the benefit of the public and the creditors it is desirable that the operation of the subway and elevated lines be kept intact.

Frank Hedley, president of the Interborough, said the company had not yet agreed to the appointment of a receiver and hoped to avert it by obtaining a one-year extension on obligations which mature on Sept. 1 and by the "further indulgence of its general creditors." For two weeks, according to a representative of the Interborough, it has been trying to obtain renewals of $38,144,000 in 7 per cent notes, which fall due Sept. 1.

These notes were issued in September, 1918, by J. P. Morgan & Company and the War Finance Corporation. Recently the Transit Commission on representations that there was no other way to avoid a receivership approved an extension of the notes for one year at 8 per cent. On Aug. 6 the Interborough sent letters to holders of record urging that the notes be renewed on these terms. It was said at the Interborough offices that a majority of the holders had given their assent, but not all.

President Hedley's statement follows:

> Saturday the American Brake Shoe & Foundry Company filed a creditor's bill in the United States Court for the Southern District of New York on its own behalf and on behalf of all creditors of the Interborough Rapid Transit Company, who may join in the suit, asking that a receiver be appointed in order that all creditors may be treated alike and that there may be no multiplicity of actions brought by creditors and noteholders in different courts.
>
> The Interborough company has appeared in this suit, but it has not yet filed its answer or consented to the appointment of a receiver. It has twenty days in which to answer, and during that time it is hoped that all of its notes maturing on Sept. 1 next will have been extended for a year, and with further indulgence of its general creditors a receivership may yet be averted.
>
> If, however, it shall become necessary ultimately to have a receiver, the filing of the bill this forenoon confers jurisdiction upon the court which is now administering the affairs of several other traction companies. It is believed this course will be of advantage to all interests involved.
>
> The filing of this bill does not change the situation as to the extension of the three-year notes.

The application was heard before Judge Mayer on Sept. 1. Counsel for the railway company admitted that the company was unable to pay its notes and requested an adjournment. The court allowed this request and set Sept. 8 for continuing the hearing in the case.

Exclusive of those operated by the Brooklyn Rapid Transit Company, all of the subway lines in the city of New York are operated by the Interborough, and the lease of the Manhattan Railway covers the Second, Third, Sixth and Ninth Avenue elevated lines. The application states in this connection that altogether the subway system comprises 47 miles of railroad and 146 miles of single track and that the elevated lines cover 37 miles of railroad and 130 miles of single track.

Accidents Increase in 1920

Accident figures in 1920 on the railways in New York City show a decrease of 37 per cent over 1919 in the number of persons struck by cars and a reduction of 11 per cent in the number of persons picked up by car fenders. Still, in the total number of mishaps including delays the 1920 figure of 35.250 is 16 per cent greater than in 1919. The comparison follows:

	1919	1920
Persons struck	1.431	892
Picked up on fenders.....	171	152
Boarding and alighting...	1,101	724
Car collisions............	644	531
Vehicle collisions........	3,367	2.816
Derailments	3,897	3,623
Equipment troubles	10,861	11,215
Other accidents	2,270	2,101
Other delays	7,036	13,196
Totals	30,278	35,250

$35,859 Profit in Seattle in July

The report of the Seattle (Wash.) Municipal Railway for July shows a profit of $35,859, but without deduction of $70,250 for bond redemption. Mayor Hugh M. Caldwell said:

> While a profit is shown in the report, a notation explains that nothing has been set aside for bond redemption. This amounts to $70.250 a month. At the present rate, we will have to go on a warrant basis again, probably on February 1 and set aside all receipts to meet the $833.000 redemption charge due on March 1 next, the first payment on retirement of the $15.000,000 purchasing bonds. The monthly charge of $56,719 for depreciation, however, has been made in these figures, although that sum has not actually been set aside.

Readjustment of Capitalization Approved

The stockholders of the North American Company, New York, N. Y., on Aug. 26 voted in favor of increasing the authorized capital stock of the company from $30,000,000 to $60,000,000, to consist of 600,000 shares of 6 per cent cumulative preferred stock of a par value of $50 each, and 600,000 shares of common stock of a par value of $50 each, and also voted in favor of the issue of one share of such preferred stock and one share of common stock in exchange for each share of the present outstanding stock of $100 par value.

Following the special meeting of the stockholders, the directors declared quarterly dividend No. 1 of 1½ per cent (75 cents per share) on the new preferred stock, and dividend No. 1 of 1½ per cent (75 cents per share) on the new common stock, both dividends payable on Oct. 1 to holders of record of Sept. 15. Dividends of 1½ per cent each on the new preferred and new common stock are equivalent to an annual rate of 6 per cent as compared with 5 per cent heretofore paid on the present stock of like par value.

The plans for the changes in the capitalization of the company were reviewed at length in the ELECTRIC RAILWAY JOURNAL for July 16, page 110.

Eight per Cent Stock Offering Successful

The customers'-stock-ownership campaign conducted by the Public Service Corporation of New Jersey recently terminated with a record of 20,700 shares of preferred stock sold. The story of the 8 per cent stock offering was told in detail in the ELECTRIC RAILWAY JOURNAL, issue of June 4.

Officials consider the sale a very successful one. They report that most of the stock was bought by the working classes and that initial payments were not withdrawals from savings accounts. It was also learned many shares were sold outside of the state.

I. C. C. Authorizes $2,200,000 Issue by Electric Line

The Interstate Commerce Commission has authorized the Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia., to issue $2,200,000 of general mortgage 7 per cent gold bonds to be pledged with the United States as collateral security for $1,885,000 in loans from the United States; to issue and sell at par for cash $700.000 of common stock; and to issue lease warrants or notes aggregating $132,159 in connection with the fulfillment of equipment. Of this $700,000 of stock proposed to be issued $207,000 is to be issued and sold at par to meet current liabilities. The proceeds of the entire issue are to be used as follows:

1. For funding maturities, $547.126.
2. For paying open accounts, $18.674.
3. For cash payments on new suburban passenger cars, $37.000.
4. For holding in the treasury for capital expenditures, maturing interest, and other proper purposes, $97 200.

Line Formerly Leased Wants Property Distributed

The Eighth Avenue Railroad, New York, N. Y., has brought suit in the New York Supreme Court against the Sixth Avenue Railroad, Job E. Hedges as receiver of the New York Railways, and others. The Eighth Avenue Railroad contends that a lease negotiated more than twenty-one years ago with the Metropolitan Street Railway as operator of the Sixth Avenue Railroad ceased upon the appointment of Job Hedges as receiver of the New York Railways, successor to the Metropolitan Street Railway.

It is alleged that the Eighth Avenue Railroad leased to the Metropolitan Railroad on Nov. 23, 1895, all of its railroad and other property for ninety-nine years, effective Jan. 1, 1896. In accordance with the lease the plaintiff alleges that it is a tenant in common with the defendant in connection with the ownership of such property known as the "Church Farm," bounded by Vesey, Chambers, Greenwich and Dey Streets and West Broadway. It maintains that this is the only property it owns jointly with the defendant.

The plaintiff alleges that it is entitled to possession equivalent to one-half and that the lease consummated for the use of the property involved ceased on Aug. 1, 1919, the day Federal Judge Mayer designated Job Hedges as receiver of the New York Railways, then leasing the Sixth Avenue Railroad.

A judgment for an immediate partition and distribution of the property is petitioned by the claimant.

Valuation Figures Under Fire in Merger

Opposition to the valuation basis proposed by the new Indiana Electric Corporation marked the opening of the Public Service Commission hearing on Aug. 26 on the corporation's petition to acquire seven Indiana utility companies and issue securities. The corporation's figures were based on the seven-year price average of 1914-1920, but counsel for cities participating in the hearing objected that the average was too high because of war prices.

The commission ordered the corporation to make a valuation based on the ten-year price average, without committing itself to the average unit price theory. Counsel for the corporation contended that the seven-year basis was fair because of fundamental economic changes resulting from the war, which would obtain for an indefinite period. The corporation also proceeded with a view to determining value on the reproduction cost new basis, but during the hearing Commissioner Barnard, who presided, indicated that the commission was not bound to accept this theory. After several expert engineers were heard, the hearing went over for a week. Most of the evidence had to do with the Merchants Heat & Light Company of Indianapolis and the Indiana Railways & Light Company of Kokomo.

Companies participating in the proposed merger are: The Merchants Heat & Light Company, Indianapolis; the Indiana Railways & Light Company, Kokomo; the Wabash Valley Electric Company, Clinton; the Putnam Electric Company, Clinton and Cloverdale; the Valparaiso Lighting Company; the Elkhart Gas & Fuel Company and the Cayuga Electric Company. Plans for the merger include the establishment of a large power plant on the Wabash River in Vigo County. The Joseph H. Brewer interests, which acquired the Merchants Heat & Light Company, Indianapolis, in 1914, are backing the merger.

$60,000,000 Terminal and Electrification Plan Disapproved

The application of the New York Central, the Cleveland, Cincinnati, Chicago & St. Louis, and the New York, Chicago & St. Louis Railroad Companies for authority to erect a passenger terminal in Cleveland has been denied by the Interstate Commerce Commission. That body said:

> We are not persuaded by the evidence now before us that the terminal problem has received adequate consideration in the public square plan either from the local or the railroad point of view, that this plan is compatible with the public interest, in its present form, or that we ought, by granting the certificates of public convenience and necessity which are sought, to lend our sanction to the enormous expenditure of capital which the plan involves.

The commission added that it was possible a further presentation of evidence might lead to a different conclusion.

The proposed station was to cost $60,000,000. The tracks were to pass 30 ft. below the street level at the Public Square. All tracks within the terminal limits were to be operated by electricity and the electrification of the steam lines was to extend beyond these limits over the trackage to be provided along the existing right-of-way. It was intended to have a system of station tracks for the interurbans.

Financial News Notes

Fresno Interurban Reports Loss.—The Fresno (Cal.) Interurban Railway after deducting interest charges, rentals and taxes reports a net corporate loss of $7,721 for the year 1920. The accumulated deficit at the end of the year amounted to $59,523.

Discount on Bonds Large.—The Public Service Commission of Indiana has authorized the Interstate Public Service Company to sell $184,000 of 5 per cent first and refunding gold mortgage bonds at 75 per cent of par. The bonds are of a 1913 issue.

Interurban Confers With Commission on Suspensions.—Attorneys for the Ohio Electric Railway, Springfield, Ohio, have discussed with members of the Ohio Public Utilities Commission the necessary steps to be taken to discontinue service on some branch lines, but no applications have been filed yet to vacate the Defiance branch.

Shore Line Tracks Will Be Removed.—The tracks between Old Saybrook and East Lyme, property of the Shore Line Electric Railway, New London, Conn., will be torn up. This removes all hope that traffic might eventually be renewed. West from Saybrook Junction, as far as Guilford, the tracks will remain undisturbed for the present.

$1,500,000 of Notes Placed.—The Havana Electric Railway, Light & Power Company, Havana, Cuba, announces that it has sold to its bankers, Speyer & Company, $1,500,000 of five year 7 per cent gold notes dated Sept. 1, 1921. The issue is secured by deposit of $3,000,000 of the company's general mortgage 5 per cent bonds.

Order Entered for Discharge of Receiver.—The final order in the case of the New York Trust Company against the West Virginia Traction & Electric Company, Wheeling, W. Va., praying for the release of Joseph D. Whittemore as receiver for the utility has been filed with John H. Conrad, deputy clerk of the United States Court for the Northern district of West Virginia. This order was received from Judge W. E. Baker at Elkins, and called for the discharge of Mr. Whittemore as receiver for the company and also for the cancellation of his bond. The case is now closed. It was heard first in this city before Judge Baker on May 5, 1921.

$1,401,000 of Bonds Offered.—Tucker Anthony, New York; Robert Garrett Sons, Baltimore, and Brooke, Stokes & Company, Philadelphia, are heading a syndicate which is offering an issue of $1,401,000 Utah Light & Traction Company 8 per cent first mortgage collateral bonds due 1934 at 99½, to yield slightly more than 8 per cent. The bonds will be guaranteed both as to principal and interest by the Utah Power & Light Company, parent concern of the Utah Light & Traction Company. They are secured by the deposit of an equal principal amount of Utah Light & Railway 5 per cent consolidatd mortgage bonds due 1934.

Would Have Water Works Line Carry Passengers.—Citizens on the line of the mile-and-a-quarter municipally owned trolley line from the Twin City lines to the water filtration plant, which is in Anoka County adjoining Minneapolis, are agitating for passenger service. The line is utilized now for freight service to the plant. A former agitation was quieted when the city's legal department ruled against it because of the liability involved. The residents now want some arrangement made with the Minneapolis Street Railway to operate the line. The company believes the revenue would not pay the cost of operation. This line operates one block over the tracks of the local company in Minneapolis.

Traffic and Transportation

Wheeling Decision Stands

I. C. C. Sees No Reason Why It Should Change Its Finding in This Important Case

The Interstate Commerce Commission, in a decision just made public in the case of William Wylie Beall vs. the Wheeling (W. Va.) Traction Company, has affirmed the findings made in its original report. Irrespective of the terms of incorporation of the railway, the commission is convinced that the company is now rendering an interstate interurban business, the charges for which are within its jurisdiction. The case is considered a fundamental one, so much so that the National Association of Railway & Utility Commissioners was granted leave to intervene. Commissioners Campbell and Eastman dissented.

In its original report, referred to in the ELECTRIC RAILWAY JOURNAL for April 23, page 789, the commission found, among other things, that the interstate passenger fares of the Wheeling Traction Company for the transportation of passengers between Steubenville, Ohio, and Wellsburg, W. Va., and between Steubenville and Weirton, W. Va., were just and reasonable fares, and that the intrastate fares of the company for the transportation of passengers in intrastate commerce between Steubenville and Brilliant, Ohio, were unduly preferential to intrastate passengers, unduly prejudicial to interstate passengers, and unjustly discriminatory against interstate commerce. In consequence it prescribed intrastate fares which would remove such preference and discrimination.

The contention of the petitioners as stated upon reargument was that the traction company renders a strictly street-railway service, over the charges for which the Interstate Commerce Commission had no jurisdiction. They pointed out that defendant had no station buildings along its line, did not do a freight business in the manner in which steam roads do, and had no through routes and joint freight rates. In support of their contention the petitioners cited the decision of the Supreme Court in the Omaha case.

The commission says it has not attempted or asserted the right to regulate the fares of an electric railway for travel within a municipality. As stated previously, the commission found no reason to modify the finding stated in its original report to the effect that

> The interstate passenger fares of the Wheeling Traction Company . . . between Steubenville and Wellsburg, and between Steubenville and Weirton are just and reasonable fares for interstate transportation over defendant's lines between those points; and that the maintenance of intrastate fares . . . between Steubenville and Brilliant lower than the just and reasonable interstate fares has resulted and will result in undue prejudice to persons traveling in interstate commerce over defendant's lines in the state of Ohio and between points in the state of Ohio and the above-mentioned points in the state of West Virginia; in undue preference of and advantage to persons traveling intrastate over defendant's lines between the points here involved in Ohio; and in unjust discrimination against interstate commerce.
>
> We further find that, whether the aforesaid passenger fares pertain to transportation in interstate commerce or to transportation in intrastate commerce, the transportation services are performed by the defendant under substantially similar circumstances and conditions.

Mr. Eastman said that he approached the case with the conviction that the activities of the commission should be confined, so far as the law permitted, to matters of national consequence. According to him the electric railways in the present case did not possess the "characteristics of an interurban line" in any greater degree. He said that no one else except the Wheeling Traction Company mainfested serious concern for the protection of interstate commerce. According to Mr. Eastman the concern of the railway was clearly a matter of revenue. He said in conclusion:

> I am unable to find in the Interstate Commerce Act any intent of Congress that we should have power to raise the intrastate fares of electric railways which happen to be engaged to some extent in interstate commerce, as most of them are, merely because of a belief that such fares are lower than they ought reasonably to be and in the absence of evidence that the free course of interstate commerce is in any substantial way obstructed or hindered. The complaint should be dismissed.

Seven-Cent Fare to Make Municipal Line Self-Sustaining

Announcement was made on Aug. 20 by the Transportation Commission at Toronto, Ont., regarding the new rate of fares that will be in force on the railway when the city takes over the Toronto Railway and merges it with the Toronto Civic Railway. Instead of a straight 5-cent fare the commission has fixed the rate at 7 cents cash for adults, or four tickets for 25 cents and sixteen tickets for $1, or fifty tickets for $3. Under the latter rate the cost of each car ride will be 6 cents. The night rates for all passengers will be 15 cents cash. As for children's fares, infants in arms will be carried free, as now, but for all others irrespective of age, not exceeding 51 in. in height, the rate is 4 cents cash or seven tickets for 25 cents.

In making the announcement the commission pointed out the increases did not provide for the rehabilitation of the system, which would be a gradual process. The commissioners said that, in considering the increases, they had been guided by the terms and conditions of their appointment, which provided that they should fix such tolls and fares as would be sufficient to make all transportation facilities self-sustaining.

Discontinuance Threatened

Lansing May Lose Railway Service Unless Return Is Allowed to the Ten-Cent Fare

At a conference on Aug. 24 between city officials of Lansing, Mich., and representatives of the Michigan United Railway, John F. Collins, vice-president and general manager of the company, declared that unless a fare increase is granted service in Lansing will have to be suspended. Mr. Collins favors a cash fare of 10 cents, with four tickets for 25 cents. The present rate is 6 cents cash, with nine tickets for 50 cents.

The four principal cities in which the company operates are Jackson, Battle Creek, Kalamazoo and Lansing. In June, 1920, the company increased its fares in all of these cities to 10 cents cash, with four tickets for 30 cents, and 5 cents for children. The increased fares were put into effect in Kalamazoo, Lansing and Jackson by order of their City Commissions, and in Battle Creek by order of the City Commission upon recommendation of the State Utilities Commission. Battle Creek authorities asked the State Commission for advice as to what fares Battle Creek people should pay and the State Commission recommended the 10-cent fare with four tickets for 30 cents and 5 cents for children.

In Kalamazoo, after the City Commission had decided on the higher fare, it submitted the case to the State Commission for similar advice, and the State Commission ordered the higher fare for Kalamazoo.

These fares were later reduced to 6 cents cash, nine tickets for 50 cents, 5 cents for children. This reduction was made originally by the City Commission of Lansing. The railway showed the Commission that it was already losing money and that this reduction of fares would increase its losses. The Commission took the view that the reduced fares would increase the volume of traffic and result in larger earnings than had been possible under the 10-cent rate.

Since compelled to adopt these lower fares in Lansing, the railway felt that it would not be just to its patrons in Kalamazoo, Jackson and Battle Creek to ask them to pay a higher fare than the people of another city were paying, so it decided to put in the same reduced fare in all four cities and in good faith await results.

In the meantime the Jackson City Commission engaged five men to investigate the affairs of the company, audit its books and determine the value of the property used in the service of this and other cities. Kalamazoo referred the matter to the State Commission. Lansing, however, insisted upon going it alone.

For the year ended May 31 the company lost in these cities the following:

Lansing	$55,587
Battle Creek	92,131
Kalamazoo	97,744
Jackson	157,643
	$403,105

Indianapolis Takes Warning from Des Moines

President of Council Says Repetition of Folly of Des Moines Would Retard City Ten Years

Indianapolis is another city confronted with the jitney problem. It appears more than likely, however, that Indianapolis will not repeat the folly of Des Moines and Saginaw. It is true that negotiations for a settlement of these problems in Indianapolis have been in a deadlock for several weeks, but at conferences during the week ended Aug. 27 it appeared a contract may be made between the city and the company fixing the regulations over the company to take the place of those provided in the franchise surrendered by the railway in June under the terms of a law enacted by the last Legislature.

AT THE conference Russell Willson, president of the Council and chairman of a Council committee which investigated jitney bus and railway problems in Des Moines, Sioux City and Kansas City, read a list of recommendations concerning the local problem which he made to the Council at the last meeting. The recommendations urged the Council to take steps toward regulating the jitneys, but not until after it has been assured that the railway and the city are to come to an agreement as to the city regulations over the company.

Mr. Willson thought that jitney regulation should include provisions to prohibit jitneys from operation in streets with railway lines, to compel jitney operators to put up indemnifying bonds and pay higher license, and to compel them to follow a specified schedule and route. Proposals were made, it was understood, which can not be agreed to except by the full board of directors of the Indianapolis Street Railway and the City Council. It seemed likely that several conferences will take place at which the various proposals will be thrashed out before a full announcement is made as to the points under consideration.

A definite understanding has been reached to attempt to fix the regulations of the city over the company by a contract between the city and the company, Corporation Counsel Ashby said. At the last conference, held several weeks ago, the company representatives, through their attorney, apparently turned down the city's proposal to fix regulations by a contract, in favor of the alternative—that they be fixed by ordinance. The city favored the contract, Mr. Ashby brought out, because it desired the rights and authority of the city over the company to be fixed permanently and not be left to continual bickering between the company and the city.

Mr. Willson's statement and recommendations to the Council follow in part:

From the committee's investigation, as detailed in the report submitted to the Council, it is my profound personal opinion:

1. We are not concerned primarily with either the welfare of the railway or the jitney bus. If regulatory legislation for the jitney bus is necessary, it should not be viewed in the light of relief for, or aid to, the railway, but purely and solely as a matter of benefit to the public—to the city—and to its individual citizens.

2. The situation existing between the railway and the city is very similar to the condition in Des Moines. The Indianapolis Street Railway has surrenderd its franchise and is operating under an indeterminate permit issued by the State. It has been the city's endeavor for some weeks to reach an understanding with the railway as to the future authority of the city over the company, and to induce the company to continue to perform some of the obligations and conditions of its previous charter.

The company recently stated to the city that it would enter into no contract with the city. The city has insisted that the obligations to be performed by the company under its old charter should be renewed by contract, as the company's contention, at the time the law was passed permitting it to surrender its charter, was that it was concerned only with the valuations, rate of fare, etc., and that it would continue to meet its other charter obligations even if operating under an indeterminate permit. Therefore, the city especially feels that the company should now, by contract, make good these assertions. The city also feels that the rights and authority of the city over the railway should be fixed and determined once and for all by contract, so that there will not be continual bickering and travail from day to day. Even though the city's rights are defined by law, what the city wants is a practical, working agreement between itself and the company without the probability of facing an appeal to the state public service body on any and every order that the city may make.

Therefore, it seems to me that if we are to consider the matter of regulation of jitney traffic, especially if it is to be considered at the railway's request, and as a means of enlarging the company's receipts, the company shall at the same time consider the city's demands; and if jitney traffic is regulated by ordinance in such a way as to offer relief to the railway, this shall be effected at such time as the company agrees, in terms, to contract as to its duties and obligations to the city.

3. It is impossible for a railway in any city to operate in successful competition against unrestricted and unregulated jitney bus traffic. The buses take the short hauls, and leave the long and unprofitable hauls to the company. They operate upon railway streets, often upon pavement paid for exclusively by the railway, and in snowy weather they operate exclusively on the car tracks after they have been swept by the railway. In fact, without regulatory laws their operation, it seems to me, constitutes entirely unfair competition, and assuming that a railway is adequately serving the community the unrestricted operation of jitney buses constitutes a real menace to that community's welfare.

4. This does not mean that a railway should be relieved from meeting fair and legitimate jitney competition. If a car company's service is adequate and it is meeting just obligations toward the city, it is my opinion that while such adequate service continues, and while the company continues to meet its obligations toward the city, the city should see to it that there is no jitney competition on railway lines. In my estimation that is the one regulation that essentially makes for fair competition. The other measures for regulation, such as a bond, schedules, licenses, etc., are for the benefit, convenience and safety of the public generally. The provision restricting jitneys from railway lines is primarily one for the benefit of the company. If parallel with car lines, it is fair competition and the passenger may choose the conveyance he prefers.

5. It is entirely bad for a city to allow unregulated, unrestricted jitney bus traffic; not only from a standpoint of unfair competition with its street car company, but especially from the standpoint of the public, the city and the safety of the individual.

6. If eventually motor transportation is entirely to supplant trolley transportation in the city, the jitney or motor bus has not as yet reached the stage of perfection necessary therefor.

7. Properly to serve the public it is necessary, in my estimation, that the jitney bus be required to file a bond covering liability for personal injuries, to follow a definite schedule and a definite route, to be driven by one who meets certain requirements as to age and ability to drive, to pay an adequate license to the city, and not to be overloaded. In addition to the above, at such time as the city is guaranteed adequate railway service and the company, by contract, agrees to continue to perform those of its former charter obligations which the city sees fit to retain, and the city can be reasonably assured that there will be no increase in rate of fare, I believe that jitney competition, by ordinance, should be immediately removed from streets containing car lines.

Mr. Willson says that both Kansas City and Sioux City having seen Des Moines as a horrible example, have avoided making the same mistakes; Kansas City by regulating its jitney traffic and Sioux City by annihilating its jitneys. He says the committee found that each city had its own peculiar problems, just as has Indianapolis. The chief peculiarity at Indianapolis was that there is now no contract or working agreement, or basis of any kind existing between the company and the city. This, of course, is not true in any of the other cities.

In Mr. Wilson's judgment, the situation in Des Moines is deplorable, and is one of the worst conditions which could befall any American city. In his estimation the visitation upon Indianapolis of such a condition as now exists in Des Moines would be the biggest single disaster that could befall the city—it would retard the city's industrial and physical growth at least ten years, and the attending publicity would cost the city and its citizens millions of dollars, hundreds of industries, and thousands of homes and inhabitants.

City Wants Lower Fares

A reduction in fares to 5 cents is the answer of the city of Little Rock to the Little Rock Railway & Electric Company's suit to restrain the city from prohibiting the collection of an advanced fare. The suit was filed recently in Second Division Pulaski Circuit Court.

In its answer the city alludes to the terms of the franchise under which the company is now operating in which the company bound itself to charge a fare not to exceed 5 cents for a period of fifty years after September, 1901. The city further stated that on petition of the railway in May, 1920, the City Council passed an amendment to the franchise permitting a 6-cent fare for a period of one year, provided at the expiration of that time the charge would automatically return to 5 cents. It holds that a 5-cent fare is just, reasonable and will yield to the plaintiff a just return.

C. E. Smith has been retained by the city to appraise the property. J. H. Perkins, engineer of the American Cities Company, which controls the railway at Little Rock, will represent the traction company. Reference to the proposed valuation was made in the ELECTRIC RAILWAY JOURNAL for Aug. 6.

Jitney Law Upheld

United States Court at New Haven Has Refused Injunction to Prevent Utility Commission Applying Recent Law

The recent act conferring on the Public Utilities Commission of Connecticut authority to grant or to refuse licenses for the operation of jitneys is not unconstitutional as alleged by the jitney men. The decision to this effect was handed down on Aug. 30 by the three judges of the United States District Court for Connecticut who heard the appeal of the jitney men at New Haven on Aug. 16. The court points out that the jitney men have adequate redress in the state courts for any injuries done them.

The court referred to the decision of the Superior Court of the State holding the jitney act constitutional. The court held that the several objections urged as to the constitutionality of the act were not well-founded. These claims were as follows:

1. That the act confers arbitrary powers on the Public Utilities Commission and permits the commission to discriminate against the plaintiffs and therefore deny to them the equal protection of the laws.
2. That the statute constitutes an unlawful delegation of legislative powers to the administrative body.
3. That it is unconstitutional and violates the due process of law guaranteed by the fourteenth amendment in that it confers an unregulated discretion and arbitrary power upon the Public Utilities Commission to grant or refuse or revoke a license.
4. That the statute in not requiring the commission to grant a hearing in the issuance, refusal or revocation of a license, denies due process of law.

The court said:

> The streets are the property of the public. (Davis v. Mass. 167 U. S. 43.) They are under the control of the public and therefore subject to the police powers of the State, excepting where the power is delegated by statute upon a municipality or other agency. (Hendrick v. Maryland, 235 U. S. 611; Nolen v. Riechman, 225 Fed. 812). The right to exercise the police power is a continuing one and may be exercised so as to meet the ever changing conditions and necessities of the public.
>
> Those who make investment for this purpose as the plaintiffs, do so and hold their property and the right to use it subject to such other and different burdens as the Legislature may reasonably impose, for the safety, convenience and welfare of the public. The State Legislature may regulate the use, by automobile and motor cars of the highways of the State. (Hendrick v. Maryland, 235 U S. 611). It may also authorize municipalities to regulate the use of streets by vehicles and may exclude vehicular traffic. (Barnes v. Essex Co. Park Comm., 86 N. J. Law, 141.)

The suit was instituted by the jitney men operating in the city of New Haven for an injunction to restrain the prosecuting attorneys of New Haven City County Courts, the chief of police, the city of New Haven and the superintendent of the state police from enforcing the law enacted at the recent session of the Legislature which made it a penal offense for the plaintiffs to carry on their business as jitney bus carriers. The Connecticut Company operating electric railways in the territory affected by transportation through jitney service appeared by intervention and was a party to the suit.

When the Public Utilities' Commission handed down its decisions on the applications for jitney licenses two months ago it suggested that in certain places where licenses were refused to individual operators the Connecticut Company put buses into service. Acting on this suggestion the Connecticut Company now has in operation two buses between East Haven and Branford, four between New Haven and Devon, two in the vicinity of Stamford, two in Brooklyn and one in High Street, Hartford. These bus lines are understood not to be paying, with the possible exception of the Devon line.

Wheeling-Pleasant Valley Buses Have Quit

The Motor Rapid Transit Company, which has operated between Wheeling and Pleasant Valley, W. Va., for several months, withdrew all buses on Aug. 20 and announced its decision to give up the fight with the Wheeling Public Service Corporation. Officials of the company say this decision was caused through the passage of a city ordinance a few weeks ago. It was generally understood that the company was preparing to fight the injunction case instituted by the railway. Classing the legislation as one of the most one-sided pieces of lawmaking ever written by any body of men, Henry Kiel, manager of the bus company, declared that Council had forced him to suspend his line. He charged that the ordinance as it was passed is a railway measure and has left the bus interests without a leg to stand on.

Date Fixed for Rehearing Los Angeles Rate Cases

The California State Railroad Commission has set Sept. 26 and 27 for the rehearing of the rate increases sought by the Los Angeles Railway and Pacific Electric Railway; Sept. 26 being the date for the Los Angeles Railway and Sept. 27 for the Pacific Electric Railway. The hearing will be conducted in Los Angeles.

The former hearing for the Pacific Electric Railway was held during July, 1920, at which time the commission granted emergency increases in freight and passenger rates along the lines as those granted to the steam roads by the Interstate Commerce Commission, while the Railroad Commission reserved the rights upon invitation of the Pacific Electric to investigate its affairs and make a service survey with view of effecting certain economies in the operation of its lines. Since July, 1920, the commission's engineers have been actively engaged in making this survey, the conclusion of which will enter into the rehearing on Sept. 27; also, at this hearing the problem of adjusting the Hollywood rates and service will be extensively dwelt upon.

The Los Angeles Railway case will again go into the subject of the application of the company for an increase in rates on its lines in the city of Los Angeles, the railway having not seen fit to accept the increases granted recently by the commission, as outlined previously in the ELECTRIC RAILWAY JOURNAL.

Commission States Reasons for Fare Authorization

In its recent finding authorizing the Minneapolis (Minn.) Street Railway to put into effect a 7-cent cash fare with four tickets for 25 cents the State Railroad & Warehouse Commission has summarized its reasons for permitting the advanced rate. This finding was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Aug. 27, page 341.

The commission states that the emergency which the Council found existing in 1920 has not been fully relieved by the present fare; the increasing operating expenses and a decreased net revenue have brought about a condition whereby the company has not been able to earn a fair return on the invested capital. Pending the valuation proceedings, which will not be terminated for several months, there is no available data whereby it could fix a valuation upon which to base a permanent rate which would change the authorized rate as fixed by the city of Minneapolis by its ordinance of Aug. 6, 1920, and which rate under chapter 278, laws of Minnesota, for 1921, "shall be and remain the authorized and lawful charge."

The 1920 ordinance was cited in this ruling and the subsequent emergency on account of which the Council authorized a 7-cent cash fare with four tickets for 25 cents, provided that until Dec. 15, 1920, the fares shall not exceed 6 cents. The company did retain the 6-cent fare after Dec. 15, and on June 24 applied to the commission for the same rate of fare which had been authorized by the City Council of Minneapolis in its ordinance of Aug. 6, 1920.

By this decision of the commission the motion of City Attorney Neil M. Cronin for a rejection of the railway's plea was overruled.

Petticoat Lane Loses Cars in Rerouting

Rerouting of cars of the Kansas City Railways under the Beeler plan, is proceeding. The earlier of the new routes established were chiefly connections of lines formerly terminating in the business district, the changes of routing being slight.

One of the most radical changes in the program was put into effect on July 10. Two lines which formerly entered the business district were connected and routed on Twelfth Street, on the south edge of the business section. The results of this routing were considered a test of the ultimate success of the whole program.

Whereas complaints might have been expected from business men and patrons, there was no criticism from either source. The rerouting in this case eliminated from the course of the two lines passage through long stretches of the congested downtown district, where streets are narrow. The route on Twelfth Street is one block from Petticoat Lane, or Eleventh Street, the heart of the women's shopping district.

Motor Buses in West Danbury

The Danbury & Bethel Street Railway, Danbury, Conn., plans a motor bus service to West Danbury. The schedule of the bus will be similar to that of the trolley. Transfers will be issued to all other lines of the city and transfers from trolley lines will be accepted on the bus. The method of payment will be pay as you leave.

Judge J. Moss Ives, receiver for the railway, has recently purchased two other buses. One will be used in Bethel to carry passengers from the railroad station to the end of the line and the other will be kept for emergency purposes.

Bus Petition Rejected

The Council of Cedar Rapids, Ia., has rejected a proposition of S. J. Markin, Minneapolis, to put buses in operation on the streets of Cedar Rapids in competition with the local electric railway.

The Council assumed the attitude that the railway paid heavy taxes and that the city could not afford to antagonize it by cutting down its revenues. Another objection to the buses was that the crowded condition of First Avenue, the principal business street, would not permit of bus traffic. Mr. Markin also sought to run a 15-cent bus line between Cedar Rapids and Marion, a neighboring city. He had obtained permission from the Marion City Council, but failed at Cedar Rapids.

Six-Cent Fare in Duluth—City Fights Ruling

The State Railroad & Warehouse Commission has authorized the Duluth (Minn.) Street Railway to increase its fares from 5 cents to 6 cents. Following this announcement, City Attorney John B. Richards applied to the district court asking for a stay and injunction against operation of the order. The injunction is requested until the court can pass upon the merits of the case. The railway had asked for a 7-cent fare. The city valuation expert is now making a valuation survey of the property. His figures will be offered in evidence by the city in its suit.

Must Not Solicit Passengers

Soliciting from taxicabs for passengers is no longer permitted in Cincinnati, Ohio. The City Council has passed an ordinance which makes it unlawful for drivers of taxicabs to solicit fares while driving. This practice has caused unnecessary congestion and many traffic tie-ups in the downtown district and has hampered the fire department. The ordinance provides fines from $5 to $100 for violations. The chief reasons for drawing up the ordinance were complaints by the fire department officials that it was almost impossible to make a "run" to the center of the city because of the traffic congestion due mostly to taxicabs soliciting passengers.

Transportation News Notes

Grants and Denies Jitney Applications.—The City Council of Seattle has granted three applications for permits to operate jitney buses on "feeder" lines north of Cowen Park, but has denied an application for a jitney route to operate in competition with the Rainier Valley car line.

Decreased Traffic Due to Jitneys.—For the twelve months ended July 31, 1921, the Virginia Railway & Power Company, Richmond, Va., carried 2,324,728 fewer passengers than for the previous year. The railway officials estimate that jitneys are taking about $600 a day from their railway.

Ten Cents Authorized.—The Grays Harbor Railway, Light & Power Company, operating between Montesano, Aberdeen and Hoquiam, Wash., has been permitted to charge a rate of 10 cents a ride on city and interurban cars, or three rides for 25 cents, according to a ruling of the Department of Public Works on July 29. The city officials of Montesano had protested against the recent change in fares, which provided for a 6-cent fare in the city and a 10-cent fare on the interurban, stating that no effort had been made to prevent jitney competition.

Requests Lower Rates.—Following approval of the City Council of Tacoma, Wash., City Attorney J. Charles Dennis has been instructed to prepare a formal petition to the Department of Public Works at Olympia requesting the Tacoma Railway & Power Company to sell thirteen tickets for $1 instead of the present plan of selling twenty-five tickets for $2. The move is the result of a petition filed with the City Council by Lorenzo Dow, who points out that the wages of railway men have been reduced, prices on materials cut, and he felt that it is unjust to require the people now to pay $2 in advance for twenty-five tickets. A letter has been sent to the railway, enclosing Mr. Dow's communication, and stating that the City Council is in sympathy with such a suggestion, and asking the company to consider it favorably. City Councilmen believe that the company would increase its business by a change of policy in its ticket sale.

Buses Comply With Law.—Under the bus regulation ordinance at Toledo, Ohio, thirty-six motor cars have registered and deposited their indemnity bonds with the city authorities. Already there have been charges of racing and combination on the part of buses on the Dorr Street line. Most of them operate in this part of the city. Independent buses came to Toledo to operate and were attacked by the organized busmen there. Offenders are threatened with revoked licenses unless schedules are properly maintained. Residents of Point Place, a lakeside suburb, have voted to remain loyal to the street cars which operate in their portion of the city. A special line was constructed some years ago to serve the community. It is a branch of the Toledo, Ottawa Beach & Northern Railroad and is operated by the Toledo Railways & Light Company. Recently buses have made such inroads that the railway service was threatened. The property owners, however, in a meeting voted 290 to 10 in favor of patronizing the street cars.

New Publications

McGraw Electric Railway Directory for August, 1921

The McGraw Electric Railway Directory is the cumulative result of more than twenty-five years' work. In the current issue more than 1,025 companies furnished new reports, and more than 5,000 changes were made from the preceding edition. The appendix contains a list of electric railways that are operating motor buses, and in the data published in the body of the book statistics are given of the number of motor buses operated.

The Engineer

By John Hays Hammond. Published by Charles Scribner's Sons, New York, 1921. Cloth 4 x 7 in., 194 pages.

To open the eyes of the youth in a quandary as to what career to follow and to aid him in analyzing his fitness for engineering is the purpose of the famous mining engineer in this valuable outline. Setting forth the qualities essential to success in engineering as imagination, integrity of purpose, accuracy of thought, capacity for judgment, ingenuity, curiosity, creative instinct and analytical ability, a standard is set by which one may measure his own fitness. Taking up successively the various main branches of engineering endeavor, the achievements to be expected in each field are vividly portrayed.

Mr. Hammond points with emphasis to the value to the engineer of a fundamental working knowledge of the English language. Finally, he pictures the engineer of the future as a man of ever-increasing importance and value to the community, both in his own profession and as an executive in government affairs, because his own training and preparation have imparted to him those very qualities of precision, honesty, aggressiveness and analytical ability, which are the prerequisites of true statesmanship. An engineering training, he concludes, so enlarges the vision as to enable one so trained to see national problems in their broadest aspects and thus be able to solve them accurately and permanently.

Personal Mention

A Rapid Rise to Manager

But 28 Years Old, L. P. Sweatt, Jr., Is Picked for Division Executive of Alabama Power

When the post of manager of the Eastern Division of the Alabama Power Company was vacated by the promotion of J. M. Barry, there was no doubt in the minds of the officials of that company as to the proper man for the place. L. P. Sweatt, Jr., had shown such a marked aptitude for, and knowledge of, the complex problems to be handled by a division manager, that he was immediately promoted to the position. Since the appointment, he has fully justified this belief and has made good in every way. Mr. Barry has been promoted to assistant chief engineer of the company, in charge of all construction work, with headquarters at Brimingham.

Mr. Sweatt was born in Montgomery, Ala., in 1893, but moved to Birmingham with his parents in 1902, where he attended grammar and high school, graduating from the Central High School in 1910. During the summer vacation period and at odd times during school days, he worked in the shop of the Louisville & Nashville Railroad in Birmingham under the personal supervision of the master mechanic. After graduating from high school, he worked for nearly two years on the construction of the new shop and power plant for the railroad at Boyles, Ala. Upon completion of the power plant at this point, he was transferred to the electric department and served as assistant engineer operating the power plant until 1912, when, realizing a long desired ambition, he entered the Alabama Polytechnic Institute at Auburn, to supplement with theory the practical knowledge gained with the Louisville & Nashville.

This practical power house experience caused him to apply for a position in the power house at school, and he was immediately appointed assistant power plant engineer. His work was very satisfactory and one year later he was made chief engineer for the entire power plant supplying light and power to the college and the city of Auburn. Working and studying at the same time proved such a satisfactory arrangement that Mr. Sweatt completed the full electrical course in three years and graduated in 1915. He immediately entered the services of the Alabama Power Company as a helper on substation maintenance, but was soon made a foreman, and in this capacity built the high-tension substation at Sylacauga and changed the Anniston substation from an indoor to an outdoor type.

In 1917 Mr. Sweatt was transferred to the commercial department, leaving the field for the office, where he assimilated the thorough commercial training that has since proved to be of great value to him as a division executive. In 1919 he returned to the operating department as superintendent of the Western Division, being later invested with the title of division manager, and his work proved so satisfactory that, as before stated, in the early part of this year he was sent to Anniston as manager of the Eastern Division, and is at present proving himself as adaptable there as he had shown himself to be in other positions.

Mr. Barry, who was Mr. Sweatt's predecessor, was manager of the Eastern Division for two years, coming to the Alabama Power Company from the Pacific Gas & Electric Company, Cal., where he had held several important positions in the operating, maintenance, and construction department. He is a native of San Francisco and is possessed of a very unusual engineering and executive ability. At present he is principally occupied in the construction of the "Mitchell Dam" 120,000-hp. hydro-electric plant at Duncan's Riffle on the Coosa River.

L. P. SWEATT, JR.

The Eastern Division of the Alabama Power Company controls the electric railway system in Gadsden and Anniston, comprising a total trackage of 22.2 miles and operating a total of 28 passenger cars. This division of the company controls the sale of electrical energy directly to consumers in local operations of about 15 town and cities. Indirectly, through other public service companies, five others are furnished with energy. In the area served there is an approximate population of 80,000.

F. D. Mahoney, commercial manager of the Alabama Power Company, Birmingham, Ala., was recently elected president of the Alabama Light & Traction Association, an old organization composed of officials of certain public utilities in that state. Mr. Mahoney, who was formerly second vice-president, succeeds H. H. Horner.

E. Don McKibben, for fifteen years an employee of the railway department of the Pennsylvania-Ohio Electric company in the New Castle district, has been appointed superintendent of Cascade Park. He assumed his new duties on July 7 and at once began the work of aiding in making the park season in New Castle a most promising one. Mr. McKibben is widely known all over the Pennsylvania-Ohio system and he carries into his new work the best wishes of his friends.

Frank Gest, for ten years in charge of the garage of the Pacific Northwest Traction Company, Seattle, Wash., and for four years previously foreman of the machine shop at Georgetown, resigned his position in July to accept one as foreman of the machine shop of the Seattle school board and also to have charge of the automobiles of the district. Mr. Gest's many friends in the company organization will regret his departure, while wishing him success in his new place. He has been succeeded in the company garage by S. S. Woodin, who for some time has been an assistant mechanic.

John C. Collins, who has been traveling supervisor of safety for the Los Angeles (Cal.) Railway, has come into charge of the safety bureau with the promotion of Hugo K. Visscher, former supervisor of safety, to the position of assistant superintendent of operation. In his work on the cars Mr. Collins has become well known to trainmen and they realize his extensive effort to help the cause of safety first. He has shown ways of avoiding many accidents that have been overlooked even by men years in service, and as supervisor of safety he aims to be of still greater help. He has been with the Los Angeles Railway for about twenty years and worked up from the train service to his present important position. For several years he was a member of the instruction department.

Obituary

Epes Randolph

Epes Randolph, president of the Arizona Eastern Railroad and the Southern Pacific of Mexico, whose death was announced last week, was one of the pioneer railroad men of the Southwest. He not only was a railroad builder of the Southwest and in Old Mexico, but had an important part in traction development, notably in Cincinnati and in Los Angeles, where he was formerly executive head of the Los Angeles Railway and the Pacific Electric Railway. At the time of his death he was an active director of the Pacific Electric Railway lines. He was also president of the California Development Company and of the East Coast Oil Company.

He began his railroading work in 1876, and from that year to 1885 he had served a half-dozen companies. Among them were the Alabama Great Southern, the Chesapeake, Ohio and Southwestern and the Kentucky Central. He was a civil engineer by profession and in that period he was engaged in location, construction and maintenance work, serving as assistant, locating, resident and division engineer and operating in several eastern states, Texas and Mexico.

Mr. Randolph in 1885 became chief engineer of the Kentucky Central, with headquarters in Covington, Ky. At the same time he served as chief engineer of the Cincinnati Elevated Railway and the Transfer & Bridge Company, for which he built a bridge over the Ohio River, connecting Covington and Cincinnati.

In 1890 he was made chief engineer and superintendent of the Newport News & Mississippi Valley Company, the Ohio & Big Sand Railroad and the Kentucky & South Atlantic Railroad, with headquarters in Lexington. The year 1891 found him in Louisville as chief engineer and general superintendent of the Chesapeake, Ohio & Southwestern and the Ohio Valley Companies. Mr. Randolph resigned in 1894, taking a trip to the West for his health. Although not in active service, he continued as adviser of several railroading and traction projects, notably the bridge over the Ohio River from Louisville to Jeffersonville, Ind.

A year after his resignation he became connected with the Southern Pacific Railroad and the most important period of his career began. For six years he was superintendent of the Arizona and New Mexico Divisions, with headquarters at Tucson, Ariz., where he made his home.

In 1901 Mr. Randolph came to Los Angeles to become vice-president and general manager of the Los Angeles Railway and the Pacific Electric Railway. He remained in Los Angeles three years, locating, building and operating some 700 miles of electric lines in Los Angeles and vicinity. While actively engaged in this work, Mr. Randolph was instrumental in projecting and constructing some of the most extensive lines of the Pacific Electric Railway. He returned to Tucson, Ariz., in 1904 to become president of the Gila Valley, Globe & Northern Railway and of the Maricopa, Phoenix & Salt River Valley Railroad, as well as the Harriman lines in Old Mexico. He became president of the consolidated companies when the Cananea, Yaqui River & Pacific Railroad lines in Mexico were absorbed by the Southern Pacific Company of Mexico and the other roads were merged with the Arizona Eastern Railway.

Mr. Randolph's death occurred very suddenly. Although for many years ill with tuberculosis he had made a valiant fight against the disease, and he had been recently attending actively to duties in connection with his executive positions.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES

BUSINESS ANNOUNCEMENTS

New Scrap Classification

Division of Purchases and Supplies of American Railway Association Revises Old Material Schedule

The American Railway Association, division 4, purchases and supplies, has prepared a new scrap iron and steel classification which will come up for adoption at that body's next meeting, which will take place in the spring of 1922. The classification is of special interest to old material dealers because, if adopted, it will be used by all of the railroads and will eliminate the special classifications now in use.

The proposed classification follows the old store-keepers' classification more closely than any of the other various classifications. Thus far the only criticism of it reported by the dealers is that it does not stipulate that No. 1 steel rails is intended to cover rails used for rerolling purposes.

Axles, steel—Car and locomotive, 6 in. diameter and over at center.

Axles, steel—Car and locomotive, under 6 in. diameter at center.

Axles, steel, hollow bored.

Axles, iron—Car and locomotive, all sizes.

Angle bars, splices and fish plates, iron.

Brake beams, uncut.

Builtup bolsters.

Couplers and knuckles, steel and steel knuckle pins, punches, finger pins, bits.

Tools and tool steel—Worn out steel tools, tool steel, files, including old claw bars, pinch bars, spike mauls, track wrenches, picks, axes, adzes, chisels, drills, hammers, knuckle pins, punches, finger pins, bits, draft keys, bar steel weighing under 10 lb. per piece.

Frogs and switches, uncut—Steel and iron frogs and switches that have not been cut apart, exclusive of manganese material.

Malleable—All malleable castings.

Rail, iron, No. 1—Iron tee rail, 3 ft. long and over, tee section 40 lb. per yard and over, free from frog, switch, guard or crooked rail.

Rail, iron, miscellaneous—All iron rail, not otherwise specified, including guard rails, switch points and frogs, when cut apart. Does not include frog fillers or plates.

Rail, steel, No. 1—Standard section steel tee rails, 50 lb. per yard and over, 5 ft. long and over, free from badly bent and twisted rails, frog, switch and guard rails and rails with split heads and broken flanges. Note: All rail suitable for relaying must be classified as relaying rail separate from all scrap rail.

Rail, steel, No. 2—Cropped rail ends under 3 ft. long, 50 lb. and over, standard section.

Rail, steel, No. 3—3 ft. long and over, 50 lb. and over, standard section having split heads or ball of rail worn with wheel flanges, curved and bent rails, free from frog, switch and guard rails.

Rail, steel, No. 4—All sections of rail not coming under specifications of No. 1, 2 or 3 rail, including frogs cut apart, guard rails and switch points. Does not include frog fillers or plates.

Spring steel No. 1—Flat spring steel, including elliptic springs from which bands have been removed.

Spring steel No. 2—All coil springs, made from steel $\frac{3}{16}$ in. and over.

Manganese steel—To include all kinds of manganese rail, frogs and switch points, cut or uncut.

Steel, high speed—High speed steel turnings (butts and ends report separately).

Tires No. 1—All locomotive or car tires 36 in. and over inside diameter, smooth inside, not grooved for retaining rings or lipped.

Tires No. 2—All tires not included in tires No. 1.

Wheels, No. 1—Includes all solid cast iron car and locomotive wheels; no allowance for grease and dirt.

Wheels, No. 2—Includes all kinds of built-up or steel-tired wheels (specify kind in offering).

Wheels, No. 3—Includes all solid rolled, forged or cast steel car and locomotive wheels (specify kind in offering).

Wrought, railroad No. 2—All wrought under 6 in. long, not specified under *No.* 1 railroad wrought; to include track spikes, bolts, nuts, rivets and lag screws.

No. 3 brass—Journal bearings free from babbitt.

No. 5 brass—Yellow brass castings, to include coach trimmings, light brass, hose couplings, pipe, tubes, etc.

Copper cable, insulated—Specify kind.

Copper, No. 1—Wire free from insulation, flue ferrules, pipe and tubes.

Copper, No. 4—Battery copper.

Lead—Battery.

Lead—Battery mud or sediment (specify wet or dry).

Zinc—Battery or sheet (specify kind).

Drop of 3 Points in Index of Railway Material Prices

The index for street railway material for July, 1921, as computed by Albert S. Richey, electric railway engineer, is 164, as compared with 167 in June of this year. A year ago the index stood at 237, while the peak, which was reached in September, 1920, was 247. Prices as they existed in 1913 are taken as the base, which is 100.

The index of street railway wages has taken a drop of 5 during the last month, the figure for August being 218. This is a drop of but 13 points since August, 1920, at which time the index was 231, but one less than the peak also reached in September, 1920.

The average street railway fare Mr. Richey gives as 7.2 cents for August. This is a drop of .01 cent during the last month and a drop of .04 cent since May, 1921, when the peak was reached. The average as given for 1913 was 4.84 cents.

It can be seen that while street railway material cost 64 per cent more than it did in 1913 and wages are 118 per cent higher, fares are only 49 per cent higher than their 1913 average.

Proposed Subway and Tunnel for Havana, Cuba

Plans for the subway system and tunnel proposed for the city of Havana, says *Commerce Reports*, have been exhibited to a representative of the American consulate general at Havana, Cuba. Indications are that the necessary concessions for the work have been approved by the Cuban Railroad Commission, and that the Cuba North & South Railroad, organized to promote this project, has been completed in accordance with Cuban laws governing the organization of companies for railroad construction. A representative of the firm of engineers in charge (Sr. Serafin Sanchez Govin, No. 62 Villegas Street, Havana), holding a full power of attorney to act for the Cuba North

& South Railroad, declared his intention of going to New York in October or November to arrange for the necessary capital and expressed a desire to receive correspondence from persons in the United States who may be interested in either the structural or the investment possibilities of the project.

Heater Manufacturers Ready

Railways Should Order Heater Repair Parts Now to Insure Prompt Deliveries

Orders for electric railway heaters this season have not been up to the standards of other years, manufacturers report, although there have been several instances where the demand has been but slightly subnormal due to a few deliveries that have followed orders for new rolling stock. The buying of heater repair parts, on the other hand, is very backward in spite of the fact that the season is fast approaching for the railways to be putting their heater equipments in order. Such feeble activity in the repair-part line suggests that the general attitude of buyers seems to be to await actual necessity before placing orders.

Manufacturers and distributers claim that they are in a fairly good position in regard to deliveries; much better than they were at this time last year, when much difficulty existed in securing raw material. Stocks are not large, but are commensurate with the present demand. If railways whose needs are pressing but which are anticipating future requirements should suddenly decide to place their orders considerable delay and congestion will be inevitable.

Prices have seen but slight changes on the whole. One jobber, however, reports a reduction of 10 to 12 per cent on prices existing several months ago. Manufacturers as yet have not seen fit to reduce prices, claiming that costs do not yet warrant any reduction and that heater prices never did soar out of sight.

The subnormal activity in the demand for heater repair parts perhaps may be accounted for by the comparatively mild weather of last winter. However, if the predictions of the seers are to be given credence that we are due for a hard winter this year, the railways had better get busy so that they may not be caught unprepared.

Calcutta Electrification Considered

Advices through the Guaranty Trust Company, New York City, state that the electrification of the suburban railways within 25 miles of Calcutta, India, is considered.

Electric Railway Projected in Piedmont Province, Italy

The Department of Commerce advises that a committee has been formed to draw a plan for the construction of a new electric railway from Mondovi to Cuneo, in northern Italy.

Rolling Stock

Los Angeles (Cal.) Railway is in the midst of an extensive program of rebuilding 98 cars. Reconstruction has passed the half-way mark and 50 new car motors of the latest type have been received and are being installed at a total cost of about $75,000. The cars being rebuilt are to have larger loading platforms, thus increasing their length about 10 ft. The new motors are Westinghouse 526, 50-hp. machines, of the ventilated, box type.

Franchises

Central California Traction Company, San Francisco, Cal., has made application for a franchise for a period of fifty years to construct, maintain and operate a railroad track of standard gauge in Stockton, San Joaquin County.

Portland-Linnton (Ore.) Railway has been granted a franchise to build and operate a street railway from Portland to Linnton using certain trackage of the United Railways. It is believed that work on the line will be started soon and it is estimated that $40,000 will be expended on the new line.

Graham, Va., is offering for sale and advertising for sealed bids by Aug. 20 a franchise to construct, operate and maintain an electric street railway in that town.

Charleston-Dunbar Traction Company, Charleston, W. Va., has applied through its president, Isaac Lowenstein, for a franchise which will give a direct connection between both companies operating in Charleston. The franchise asked for would permit the Charleston-Dunbar cars to use the Interurban company's tracks on Charleston Street between Elk River and Edgewood and thus obviate the Charleston-Dunbar long detour through the west side. President Lowenstein explained that the purpose of the application for the franchise was to secure a harmonious working arrangement between the lines of the Charleston-Dunbar Company and the Interurban company as rapidly as possible, and he intimated that the plans now in process of formation may ultimately lead to the operation of the two lines under a joint management that would be to all purposes practically a consolidation.

Track and Roadway

Concepcion-Horqueta Railway may be extended to the Brazilian border in accordance with a project now under consideration by Brazil and Paraguay. The line would be linked up from Bella Vista with the Noroeste at Campo Grande or at Pedro Juan Caballere with the branch of the Sorocabano now being built west from Botucatu. Traffic for this railway would consist principally of cattle and hides.

Ottawa (Ont.) Electric Railway is relaying 1½ miles of track with 80 lb. T-rail and is equipping a new transformer room at a substation.

Dallas-Terrell Interurban Railway will start work about Sept. 1, according to C. W. Hobson, vice-president of the Dallas Railway, which is to build the new line. Mr. Hobson said that the proposed road would cost approximately $1,800,000. Nearly all of the right-of-way has been obtained, and orders for materials are being placed. The line is being constructed in compliance with the terms of the franchise under which the Dallas Railway is operating.

Wichita Falls (Tex.) Traction Company is building approximately 4,000 ft. of new track through paved streets. The company expects to build this track with 75-lb. standard T-rail with special trackwork of 120 lb. high T-rail. The contract for all special trackwork has been let to the Lorain Steel Company, Johnstown, Pa., and shipment is expected to be made within the next fifteen days. Dayton mechanical steel ties and joint ties set on 2-ft. centers are to be used for all of this work. The company also expects to build some 2 miles of track in other parts of the town, beginning at the intersection of Broad and Thirteenth Street, and running south on Thirteenth Street, making an intersection with the present line, which is known as the Southland line. This, when completed will save an operation of some sixteen blocks on each round trip. Plans are also being made to build in the near future a line across the Wichita River into the refinery district.

Danville Traction & Power Company, Danville, Va., has been overhauling one of its double tracks on Main Street from the Municipal Building to Mt. Vernon church. The grade of the tracks has been raised three-quarters of an inch.

Power Houses, Shops and Buildings

Lexington (Ky.) Utilities Company is preparing to spend $100,000 for new buildings and new equipment.

The Twin City Rapid Transit Company has begun to replace the chain grates in its steam plant on the Mississippi River in Minneapolis with Westinghouse underfeed stokers. The six boilers already re-equipped have increased their rating from 175 per cent to 300 per cent. The plant altogether has twenty-eight boilers and ultimately all will be equipped with the stokers, the purpose being to keep the steam plant up to the complete quota of demand. This steam plant was first equipped in 1903 with Westinghouse Roney stokers. In 1910 these were changed to chain grates. The capacity of the plant is 50,000 kw.

Salt Lake, Garfield & Western Railroad, Salt Lake City, Utah, suffered a fire on Aug. 8, which almost totally destroyed its carhouses and rolling equipment. The loss, which is estimated at $150,000, is fully covered by insurance. No serious curtailment of traffic has resulted, as plans were immediately put into effect for the hiring of equipment with which to continue service. The carhouses will be rebuilt.

Trade Notes

D. J. Bokes has been appointed manager of the Charleston, W. Va., office of the Automatic Reclosing Circuit Breaker Company, of Columbus, Ohio, with headquarters at 110 Hale Street, Charleston.

R. L. McLellan, formerly of the Chicago office of the Westinghouse Electric & Manufacturing Company, has been appointed assistant to director of heavy traction, with headquarters at the New York office.

The Crane Company, manufacturer of pipe valve fittings, steam fittings, etc., is constructing a new one-story building 100 ft. x 145 ft., adjoining its present works at 490 Cherry Street, New York City. The cost is estimated at $28,000. The new building will be used for assembling purposes and to provide storage space for material being held for export.

The Glidden Company, Chicago, through its president, Adrian D. Joyce, has been successful in making arrangements for the manufacture and distribution of ripolin enamel paint in America. It will be more extensively advertised and merchandised than ever before. It is known in this country largely for its merit as a long life interior and exterior architectural enamel and in European countries has attained its greatest distinction as the best finish for all types of railway rolling and signal equipment. This enamel will be manufactured according to the original formulæ in the various factories comprising the Glidden organization. Quantities of ripolin have been imported to take care of the demand until the American manufacturers can produce it themselves under the supervision of foreign experts, who are now on their way to this country.

New Advertising Literature

Ohmer Fare Register Company, Dayton, Ohio, is now distributing throughout the railway field a booklet on the Ohmer system of fare collection. The influence of a printed record on the conductor is outlined as well as the possibilities of the company in making use of the information on this record.

General Electric Company, has just made available bulletin No. 46041 which fully describes a device known as the type H-2 A-C temperature indicator. This instrument affords the operator an easy and convenient means of determining at the switchboard the hot-spot temperature of the windings of transformers under all operating conditions. The bulletin also contains a complete wiring diagram for this apparatus.

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for the use of manufacturers, engineers, financial houses, railway companies, public service commissions and libraries:

McGraw Electric Railway Directory

Revised twice a year from information gathered by direct contact with the companies listed—

This Work Gives the Following Information:

[1] A complete list showing the correct name of every recorded electric railway company in the United States, Canada and Mexico, arranged by States and Cities.

[2] Address of each company.

[3] Names of affiliated and controlling corporations.

[4] Names of principal communities on routes.

[5] Names and addresses of corporation officers and principal department heads, including purchasing agents.

[6] Names and addresses of holding or controlling companies and lists of properties controlled by each.

[7] Names and addresses of consulting engineers, if any.

[8] Addresses of power plants and repair shops.

[9] Number and make of generators, stating capacity, voltage, whether d.c. or a.c., and if a.c., phase and cycles.

[10] If water power is used, horsepower and make of hydraulic turbines.

[11] If steam power is used, horsepower and make of boilers and engines.

[12] If gas or oil engines are used, horsepower and make.

[13] Transmission voltage.

[14] Trolley voltage.

[15] If energy is purchased, from whom.

[16] Number and capacity of substations, number of rotary converters, and motor generator sets used.

[17] Amusement parks reached, whether owned or controlled by company.

[18] Mileage of the road, owned, leased and trackage rights.

[19] Gage of track.

[20] Number and kind of rolling stock used.

[21] Doing a lighting business.

[22] Date of latest information.

[23] Names, officers and executive committees of Electrical Railway Associations, arranged alphabetically by name.

[24] Names, commissioners and principal assistants of National and State Railroad and Public Utility Commissions, arranged alphabetically by States.

[25] Statistics of Motor Buses operated by Electric Railways.

[26] Alphabetical list of Electric Railway Officials, indexed for company connections.

[27] Alphabetical index to companies.

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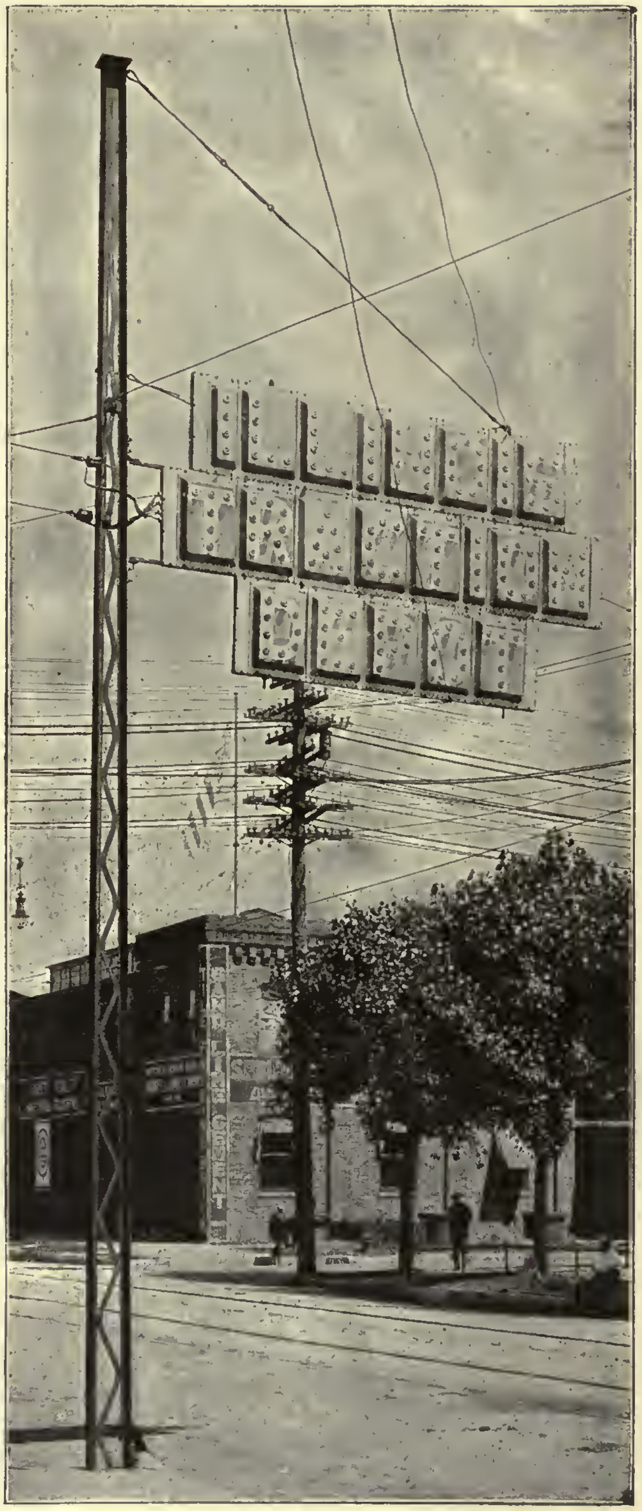

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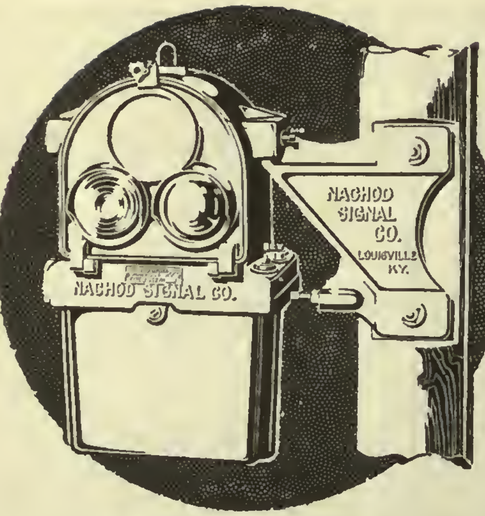

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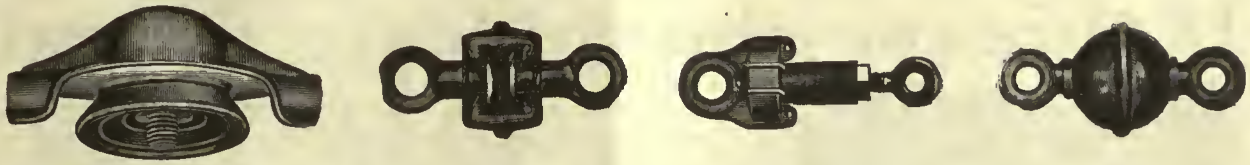

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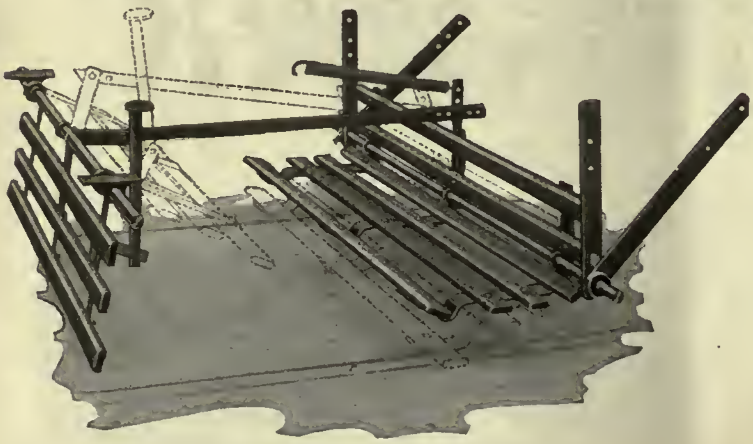

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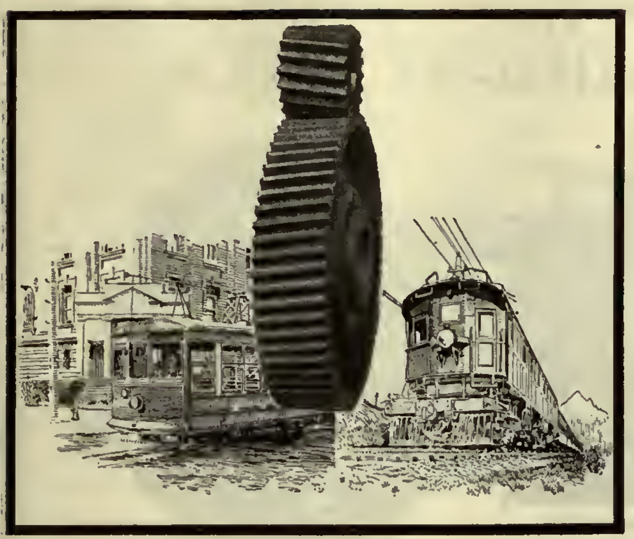

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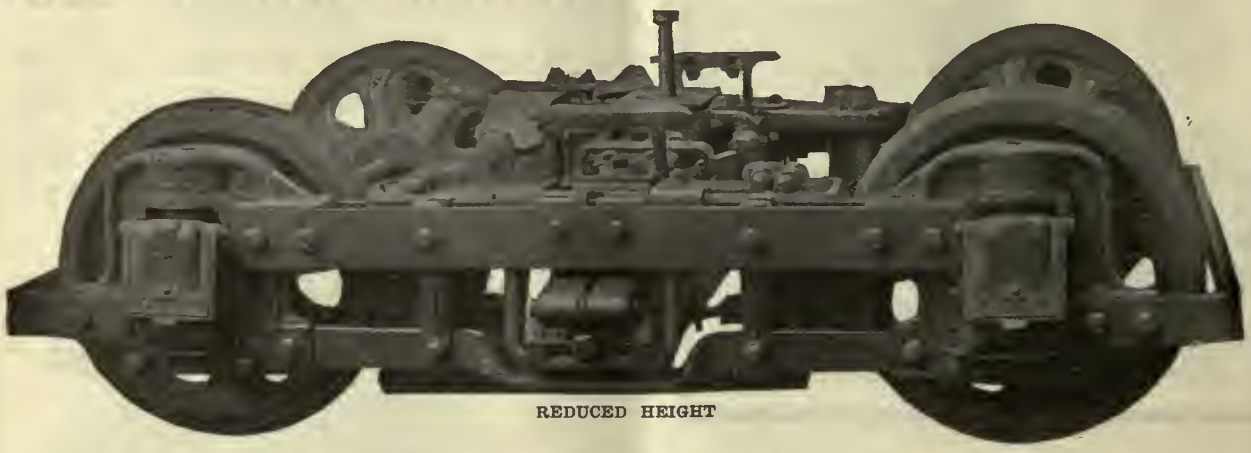

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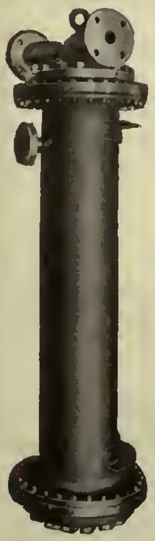

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—is an empty phrase, where a FORD TRIBLOC is used. The men keep their eyes on their work, serene in the knowledge that the hand chain *can't* gag, that the load *can't* slip back. The FORD TRIBLOC holds and hoists swiftly and *securely*.

Capacities up to 40 tons.

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FORD CHAIN BLOCK CO.

2nd AND DIAMOND STREETS PHILADELPHIA, PA.

NILES-BEMENT-POND CO.

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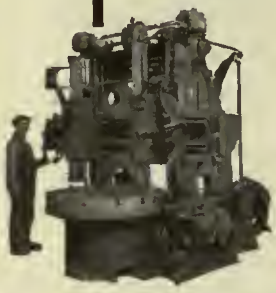

MACHINE TOOLS

FOR ELECTRIC RAILWAYS

- **Axle Lathes**
- **Wheel Presses**
- **Car Wheel Lathes**
- **Boring Mills**
- **Lathes**
- **Hammers**
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- **General Machine Tools**

Use only Awebco Tape on your Armatures

Field Coils have better protection when wound with "AWEBCO Tape." Send for samples.

ANCHOR WEBBING COMPANY

300 Brook Street, Pawtucket, Rhode Island

J. H. WILLIAMS & CO.

"THE WRENCH PEOPLE"

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THE TERRY TURBINE

For Driving Your Auxiliaries

TERRY STEAM TURBINE CO.

Hartford, Conn

BAKELITE-DILECTO

The fields of usefulness for Bakelite-Dilecto are many and varied because of its superior merit over materials heretofore available in sheets, tubes or rods. The exceptional qualities of Bakelite-Dilecto are satisfying electric railways all over the country. Investigate.

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BUCKEYE JACKS

high-grade R. R. Track and Car Jacks.

The Buckeye Jack Mfg. Co.

Alliance, Ohio

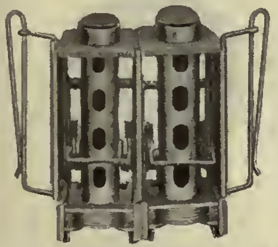
The absence of intricate mechanism not only makes the maintenance cost of

Cleveland Fare Boxes

very low but practically eliminates fare box failures.

The Cleveland Fare Box Co.
CLEVELAND, OHIO
Canadian Cleveland Fare Box Co., Ltd.
Preston, Ontario

JOHNSON Universal Changer



Adjustable

The only changer on the market which can be adjusted by the conductor to throw out a varying number of coins, necessary to meet changes in rates of fares.

Flexible

Each barrel a separate unit, permitting the conductor to interchange the barrels, to suit his personal requirements and to facilitate the addition of extra barrels.

JOHNSON FARE BOX COMPANY
Ravenswood, Chicago, Ill.

Use them in your terminals—
PEREY TURNSTILES
or PASSIMETERS
Faster than the ticket seller
Perey Manufacturing Co., Inc.
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ELECTRIC HEATER EQUIPMENTS

GOLD CAR HEATING & LIGHTING CO.
NEW YORK CITY
PATENTED

THERMOSTAT CONTROL EQUIPMENTS

Address All Communications to
BUSH TERMINAL
(220 36th St.)
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Literature on Request

Heating and Ventilating

Let us demonstrate to you how we can heat and ventilate your cars at the lowest possible cost.

The Cooper Heater Company
Carlisle, Pa.

Electric car heaters—thermostatic control—pneumatic car door operators—buzzers, single-stroke bells, starting signal lights—special resistances.

CONSOLIDATED CAR HEATING CO.
ALBANY, NEW YORK, CHICAGO

You too can make the Yale Way your Way

THE shops of The Terry Steam Turbine Company give impressive evidence of Yale Way Efficiency.

More than 50 Yale Spur-Geared Chain Blocks are used here for swinging the work into place at the various machines and on to the final assembly. This is the Yale Way.

You may not manufacture turbines but there's Yale Way Efficiency for you nevertheless.

Yale Spur-Geared, Screw-Geared and Differential Chain Blocks, Electric Hoists, I-Beam Trolley Systems, Electric Industrial Trucks, Tractors and Trailers introduce substantial savings wherever installed.

Yale Made is Yale Marked

The Yale & Towne Mfg. Co.
Makers of Yale Products: Locks, Hoists and Electric Industrial Trucks.
Stamford, Conn. U. S. A.

YALE Hoisting and Conveying Systems

HIGH SPEED MONEY CHANGERS

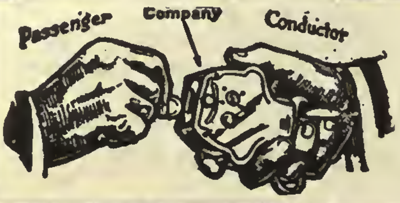
The new 1921 model—without rivets—ready for delivery

Supplied in one or four tube combinations

Essential wherever the rapid and accurate handling of change is required. Now included in the standard equipment of largest Traction Companies because conductors demand them. Prices and literature sent on request.

J. L. GALEF, 75 Chambers St., New York City
Exclusive Manufacturers' Selling Agent

Economical in the Long Run
BONNEY-VEHSLAGE TOOL CO.
Newark, N. J.



Direct Automatic Registration By the Passenger
Rooke Automatic Register Co.
Providence, R. I.

BECAUSE its initial price, plus cost of lubrication, divided by total miles of actual travel during its longer life, gives a lower cost per car mile than a cheaper wheel.

Low priced copper makes this the right time to stock up.

Hensley Trolley & Mfg. Co.
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National Railway Appliance Co.

50 East 42nd St., New York City

Hegeman-Castle Corporation
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National Railway Appliance Co.
Munsey Bldg., Washington, D. C.

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- Tool Steel Gears and Pinions
- Anderson Slack Adjusters
- Genesco Paint Oils
- Dunham Hopper Door Device
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- Flaxlinum Insulation
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- H & W Electric Heaters
- Garland Ventilators
- Pitt Sanders
- National Safety Car Equipment Co's One-Man Safety Cars

See the Crank of the

CREAGHEAD DESTINATION SIGN

By means of it, conductor or motorman can change sign without leaving platform. All that has to be done is to turn the crank. Better investigate.

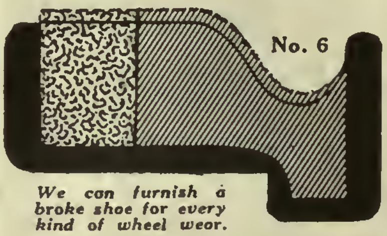
CREAGHEAD ENGINEERING CO., CINCINNATI, O.

N-L

Indicating Signals
Mechanical Sanders
Ventilators, Smokestacks
Pneumatic Sanders
Selector Switches, Lanterns, etc.

THE NICHOLS-LINTERN CO.
8404 Lorain Ave., Cleveland, Ohio

Sharp Flanges Are Costly



We can furnish a brake shoe for every kind of wheel wear.

They often cause derailments. You can eliminate them and guarantee safe service by equipping your cars with wheel truing brake shoes.

When only outer part of the tread needs grinding, ask for this type of brake shoe.

Wheel Truing Brake Shoe Co.
Detroit, Michigan
U. S. Trade Mark—Wheel Truing Brake Shoe

The Kalamazoo Trolley Wheels

have always been made of entirely new metal, which accounts for their long life WITHOUT INJURY TO THE WIRE. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD.

THE STAR BRASS WORKS
KALAMAZOO, MICH., U. S. A.

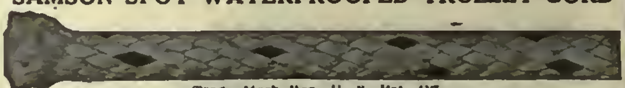
"Boyerized" Products Reduce Maintenance

- Bemis Trucks
- Case Hardened Brake Pins
- Case Hardened Bushings
- Case Hardened Nuts and Bolts
- Manganese Brake Heads
- Manganese Transom Plates
- Manganese Body Bushings
- Bronze Axle Bearings

Bemis Pins are absolutely smooth and true in diameter. We carry 40 different sizes of case hardened pins in stock. Samples furnished. Write for full data.

Bemis Car Truck Co., Springfield, Mass.

SAMSON SPOT WATERPROOFED TROLLEY CORD



Trade Mark Reg. U. S. Pat. Off.

Made of extra quality stock firmly braided and smoothly finished. Carefully inspected and guaranteed free from flaws. Samples and information gladly sent.

SAMSON CORDAGE WORKS, BOSTON, MASS.

A Single Segment or a Complete Commutator

is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.

Cameron Electrical Mfg. Co., Ansonia, Connecticut

RAILWAY UTILITY COMPANY

Sole Manufacturers
"HONEYCOMB" AND "ROUND JET" VENTILATORS
for Monitor and Arch Roof Cars, and all classes of buildings;
also ELECTRIC THERMOMETER CONTROL
of Car Temperatures.

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They are uniform in quality

They talk for themselves

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CAR WORKS

Manufacturer of Cars
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Cars of all types from one-man to large interurban

HIGH POINT, N. C.

SASHES, DOORS
INTERIOR FINISH
VESTIBULES AND FRAMING

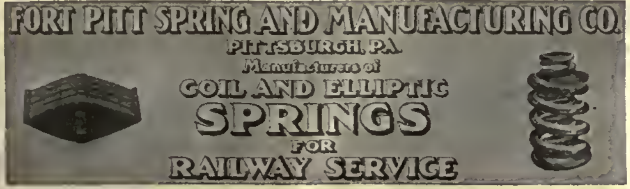
CURTAINS, VENTILATORS
SASH AND DOOR TRIMMINGS
DOOR AND STEP MECHANISM

THE DIFFERENTIAL STEEL CAR CO.

H. Fort Flowers, Pres. and Gen. Mgr.
FINDLAY, OHIO

DURSON BRAKE REGULATOR

—more than a slack adjuster
HAMILTON & HANSELL, Inc.
13 Park Row, New York, N. Y.



FORT PITT SPRING AND MANUFACTURING CO.
PITTSBURGH, PA.
Manufacturers of
COIL AND ELLIPTIC
SPRINGS
FOR
RAILWAY SERVICE

PS HEATERS

Car Heating and Ventilation
is one of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment. Now is the time to get your cars ready for next winter. Write for details.

The Peter Smith Heater Company
1725 Mt. Elliott Ave., Detroit, Mich.

BETTER THAN BABBITT
wears longer—runs cooler—costs less
used by electric railways at home and abroad
AJAX BULL BEARING ALLOY
made from the purest virgin metals to a scientifically correct formula by the AJAX PROCESS which greatly increases endurance and wearing qualities.
THE AJAX METAL COMPANY
Established 1880
Main Office and Works: Philadelphia, Pa.

HASKELITE
The Plywood made with waterproof glue

An Engineering Material
used by car builders
for
Roofs
Headlining
Side Panels
Ceilings
Bottoms and Backs of Seats

Write for Samples and Prices

HASKELITE MANUFACTURING CORP.
133 W. Washington St., Chicago, Illinois

Think "SEARCHLIGHT" First

ADVERTISING RATES

POSITIONS VACANT—Business Opportunities and other undisplayed ads, 8 cents a word, minimum $2.00 an insertion.

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ADD 5 WORDS for box number in undisplayed ads if replies are to any of our offices. There is no extra charge for forwarding replies.

DISCOUNT OF 10% if one payment is made in advance for 4 consecutive insertions of undisplayed ad.

ADS IN DISPLAY TYPE—Space is sold by the inch (30 in. to a page), the price depending upon total space used within a year, some space to be used each issue.

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8 to 14 in., $4.10 an in.
15 to 29 in., $3.90 an in.
30 to 49 in., $3.80 an in.
50 to 99 in., $3.70 an in.

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POSITIONS VACANT

AUDITOR wanted for one of the largest groups of public utilities in the United States including gas, electric and street railways properties. Excellent opportunity for advancement. State age, education, present salary and furnish references and complete service record. P-339, Elec. Ry. Journal.

WANTED—A first class armature winder foreman. Man capable of handling a large winding room and familiar with all modern methods. Location Central States. P-335, Elec. Ry. Journal, Leader-News Bldg., Cleveland, O.

POSITIONS WANTED

ELECTRICAL engineer enjoying pleasant relations on the engineering staff of an electric railway apparatus maufacturer desires, for personal reasons, to connect as master mechanic, superintendent of equipment or overhead, electrical superintendent, or local or district superintendent for a railway, power or combined utility, preferably Middle West; in service since 1903; available 30 days; minimum salary $3,000. PW-930, Elec. Ry. Journal, Real Estate Trust Bldg., Phila.

SUPERINTENDENT of transportation with a proven record of 17 years with large city and interurban properties, desires a change. Very successful in dealing with public and labor and knows how to get results from employes. High grade references as to character and ability. Would prefer a good size city property. Relations with present employers pleasant and satisfactory. Personal reasons for desiring change. Address with details. PW-336, Elec. Ry. Journal, Old Colony Bldg., Chicago.

POSITIONS WANTED

ENGINEER or designer on electrical car equipment; six years' experience; thoroughly familiar with strength of materials and electrical engineering; moderate salary asked. PW-338, Elec. Ry. Journal.

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Magazines Wanted

Back numbers of Electric Railway Journal wanted from 1910 to date. The H. W. Wilson Co., 964 University Ave., New York, N. Y.

The Searchlight Advertising in This Paper

is read by men whose success depends upon thorough knowledge of means to an end—whether it be the securing of a good second-hand piece of apparatus at a moderate price, or an expert employee.

The Best Proof

of this is the variety of this journal's Searchlight ads. Without a constant and appreciable *demand* for such machinery or services, by its readers, the market-place which these advertisements represent could not exist for any length of time.

Are *you* using the Searchlight Section?

0200

"SEARCHLIGHT" IS Opportunity Advertising

—to help you get what you want.

—to help you sell what you no longer need.

Take Advantage Of It
For Every Business Want

"Think SEARCHLIGHT First"

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FOR SALE
22 New General Electric
203-P
Railway Motors
Transit Equipment Company
501 Fifth Avenue, New York

MECH. 57

SEAT 57 S.C.

SEAT 327 S.B.

NEW CAR SEATS

with HEYWOOD-WAKEFIELD guarantee

20% off Manufacturer's Price

Sale Price	Mfr's Price	
$10.80	$13.50	Mechanism only.
$25.60	$32.00	Mechanism with Rattan Seat and Back
$20.00	$25.00	Mechanism with Slat Seat and Back.

Length overall 31¼ in.—29 in. cushion.
Back Offset—Aisle 2¼ in.—Wall 1¼ in.

Available for SAFETY or other type cars

These seats are NEW and in original package at factory. Prices quoted F.O.B. Wakefield, Mass., and carry MANUFACTURER'S GUARANTEE

Reclamation Department

EASTERN MASSACHUSETTS STREET RAILWAY CO.
1 Beacon Street, Boston, Mass.

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Well established supply house in New York City, with warehouse and delivery service, aggressive selling organization now doing business with the largest contractors, steam and electric railroads, desires exclusive agency or to act as manufacturers representetive in New York and vicinity for contractors' equipment, tools and railroad specialties. Nothing but substantial high grade products considered. Any reference.

AS-333, Electrical Railway Journal
10th Ave. at 36th St., New York City

BOILERS

Several 1000 hp. Edgemoor Water Tube—A.S.M.E. code—200 lbs. Used 3 to 6 months—Foster Superheaters—Taylor Stokers—Diamond Soot Blowers—Extra Heavy Piping and Expert Engineering Services to plan your installation.

ROY BRENHOLTS, *Trustee*, Columbus, O.
1015 Outlook Bldg.

For 20 Years

we have been
Buying and Selling

Second-Hand Cars

Trucks and Motors

At Your Service

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa

IMMEDIATE DELIVERY

2—1000-Kw. Westinghouse Synchronous Motor Generator Sets

Motor end—1400 kva. 2300/4000 volts, 80% P.F., 3 phase, 60 cycle, with direct connected exciter.

Generator end—1000 kw. interpole design, 600 volt, 1666 amp., speed 514 r.p.m.

Outfits were built to operate continuously under 35 degree rise in temperature. Send for further details and prices.

ARCHER AND BALDWIN, INC.
114 Liberty St., N. Y. C. Telephone 4337-4338 Rector.

25-CYCLE

500-KW. RAILWAY SUBSTATION

FOR SALE

1—500 kw. 600 v. Rotary Converter G. E. Co. Type H.C.-6—500-500—Form M 25 cycle—Speed 500 D.C.—Volts 600—amps. 833, Complete with speed limit and oscillator.

3—185 kva. Transformers—G.E. Co. Type H—Form P—25 Cycle—33,000 volts to 430/143 Oil insulated self cooled.

Complete with a.c. and d.c. switchboard panels, starting panel, 35,000 volt oil switch, disconnects, &c.

All in first class operating condition; can be seen running; available immediately

Another unit simliiar to above except voltage 6600; available soon
Inspect and make us an offer,

Reason for selling, compelled to change to 60 cycle

THE KANSAS CITY, LEAVENWORTH & WESTERN RY.
Fourth and Minnesota, Kansas City, Kansas

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Purifiers
Horne Mfg. Co.

Anchors, Guy
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Automobile and Buses
Brill Co., The J. G.

Axle Straighteners
Columbia M. W. & M. I. Co.

Axles, Car Wheel
Bemis Car Truck Co.
Brill Co., The J. G.
Cambria Steel Co.
Midvale Steel & Ordnance Co.
St. Louis Car Co.
Standard Steel Works Co.
Taylor Electric Truck Co.
Westinghouse Elec. & M. Co.

Babbitt Metal
More-Jones B. & M. Co.

Babbitting Devices
Columbia M. W. & M. I. Co

Badges and Buttons
Electric Service Supplies Co.
International Register Co., Th

Bankers & Brokers
Coal & Iron National Bank

Bearings and Bearing Metals
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
General Electric Co.
More-Jones Brass & Metal Co.
St. Louis Car Co.
Taylor Electric Truck Co.
Westinghouse Elec. & M. Co.

Bearings, Center and Roller Side
Stucki Co., A.

Bells and Gongs
Brill Co., The J. G.
Columbia M. W. & M. I. Co
Electric Service Supplies Co.
St. Louis Car Co.

Benders, Rail
American Chain Co., Inc.
Niles-Bement-Pond Co.
Watson-Stillman Co.

Boilers
Babcock & Wilcox Co.

Bond Testers
American Steel & Wire Co.

Bonding Apparatus
American Steel & Wire Co.
Electric Railway Improvement Co
Electric Service Supplies Co.
Ohio Brass Co.

Bonds, Rail
American Steel & Wire Co.
Copper Clad Steel Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Boring Tools, Car Wheel
Niles-Bement-Pond Co.

Brackets and Cross Arms. (See als Poles, Ties, Posts, Etc.)
American Bridge Co.
Bates Expanded Steel Truss Co
Creaghead Eng. Co.
Electric Railway Equipment Co
Electric Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Hamilton & Hansell, Inc.
National Railway Appliance Co
Westinghouse Traction Brake Co

Brake Shoes
Amer. Brake Shoe & Fdry. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.
Taylor Electric Truck Co.
Wheel Truing Brake Shoe Co.

Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
Horne Mfg. Co.
National Brake Co.
Safety Car Devices Co.
St. Louis Car Co.
Taylor Electric Truck Co.
Westinghouse Traction Brake Co.

Bridges and Buildings
American Bridge Co.

Brooms, Track, Steel and Rattan
American Rattan & Reed Mfg. Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Westinghouse Elec. & M. Co.

Brush Holders
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.

Bunkers, Coal
American Bridge Co.

Buses, Motor
Republic Truck Sales Corp.
Trackless Transportation Co.

Bushings, Case Hardened & Manganese
Bemis Car Truck Co.
Brill Co., J. G.

Bushings, Graphite & Wooden
Bound Brook Oilless Bearing Co

Cables. (See Wires and Cables)

Carbon Brushes. (See Brushes, Carbon)

Car Panel Safety Switches
Westinghouse Elec. & Mfg. Co.

Cars, Dump
Differential Steel Car Co., Inc.

Cars, Passenger, Freight, Express etc.
American Car Co.
Brill Co., The J. G.
Cambria Steel Co.
Kuhlman Car Co., G. C.
Midvale Steel & Ordnance Co.
McGuire-Cummings Mfg. Co.
National Railway Appliance Co
St. Louis Car Co.
Thomas, Perley A.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Car, Self-Propelled
General Electric Co.

Castings, Brass, Composition o Copper
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
More-Jones Brass & Metal Co.

Castings, Funnel
Wharton, Jr. & Co., Inc., Wm.

Castings, Gray Iron and Steel
American Bridge Co.
American Steel Foundries
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.
Standard Steel Works Co.
Wharton, Jr. & Co., Inc., Wm.

Castings, Malleable and Brass
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Catchers and Retrievers, Trolley
Earll, C. I.
Electric Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Ceiling Car
Pantasote Co.

Change Carriers
Galef, J. L.

Circuit Breakers
Condit Elec'l Mfg. Co.
Cutter Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Clamps and Connectors for Wires and Cables
Anderson Mfg. Co., A. & J. M.
Electric Railway Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Hubbard & Co
Westinghouse Elec. & Mfg. Co.

Cleaners and Scrapers Track—(See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Ohio Brass Co.
Root Spring Scraper Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling—(See Conveying and Hoisting Machinery)

Coil Banding and Winding Machines
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Coils, Armature and Field
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Coils, Choke and Kicking
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Coin-Counting Machines
Electric Service Supplies Co.
International Register Co., The
Johnson Fare Box Co.

Commutator Slotters
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Electrical Mfg. Co
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Compressors, Air
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Trac. B. Co

Condensers
General Electric Co.
Schutte & Koerting Co.
Westinghouse Elec. & Mfg. Co

Conduits, Underground
Standard Underground Cable C

Connectors, Solderless
Westinghouse Elec. & Mfg. Co.

Controllers or Parts
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Controller Regulators
Electric Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Converters, Rotary
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Conveying and Hoisting Machiner
American Bridge Co.
Columbia M. W. & M. I. Co.

Copper Wire
Anaconda Copper Mining Co.
Copper Clad Steel Co.

Cord, Bell, Trolley, Register, etc.
Brill Co., The J. G.
Electric Service Supplies Co
International Register Co., Th
Roeblings Sons Co., John A.
Samson Cordage Works

Cord Connectors and Couplers
Electric Service Supplies Co
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
American Steel Foundries
Brill Co., The J. G.
Ohio Brass Co.
Westinghouse Trac. B. Co

Cranes
Niles-Bement-Pond Co.

Cross Arms. (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossings, Frogs and Switches
Wharton, Jr. & Co., Inc., Wm.

Crossing Signals. (See Signals, Crossing)

Crossings, Track. (See Track, Special Work)

Culverts
Canton Culvert & Silo Co.

Curtains and Curtain Fixtures
Brill Co., The J. G.
Electric Service Supplies Co
Pantasote Co.
St. Louis Car Co.

Dealers' Machinery
Archer & Baldwin
Cleveland Armature Wks
Electric Equipment Co.

Destination Signs
Columbia M. W. & M. I. Co.
Creaghead Eng. Co.
Electric Service Supplies Co.

Detective Service
Wish Service, P. Edward

Dogs, Lathe
Williams & Co., J. H.

Door Operating Devices
Consolidated Car Heating Co.
National Pneumatic Co., Inc.
Safety Car Devices Co.

Doors and Door Fixtures
Brill Co., The J. G.
General Electric Co.

Doors, Folding Vestibule
National Pneumatic Co., Inc.

Door and Shutters, Fireproof
Kinnear Mfg. Co.

Doors, Steel Rolling
Kinnear Mfg. Co.

Draft Rigging. (See Couplers)

Drills, Track
American Steel & Wire Co.
Electric Service Supplies Co
Niles-Bement-Pond Co.
Ohio Brass Co.

Dryers, Sand
Electric Service Supplies Co.

Electrical Wires and Cables
American Electrical Works
Roebling's Sons Co., J. A

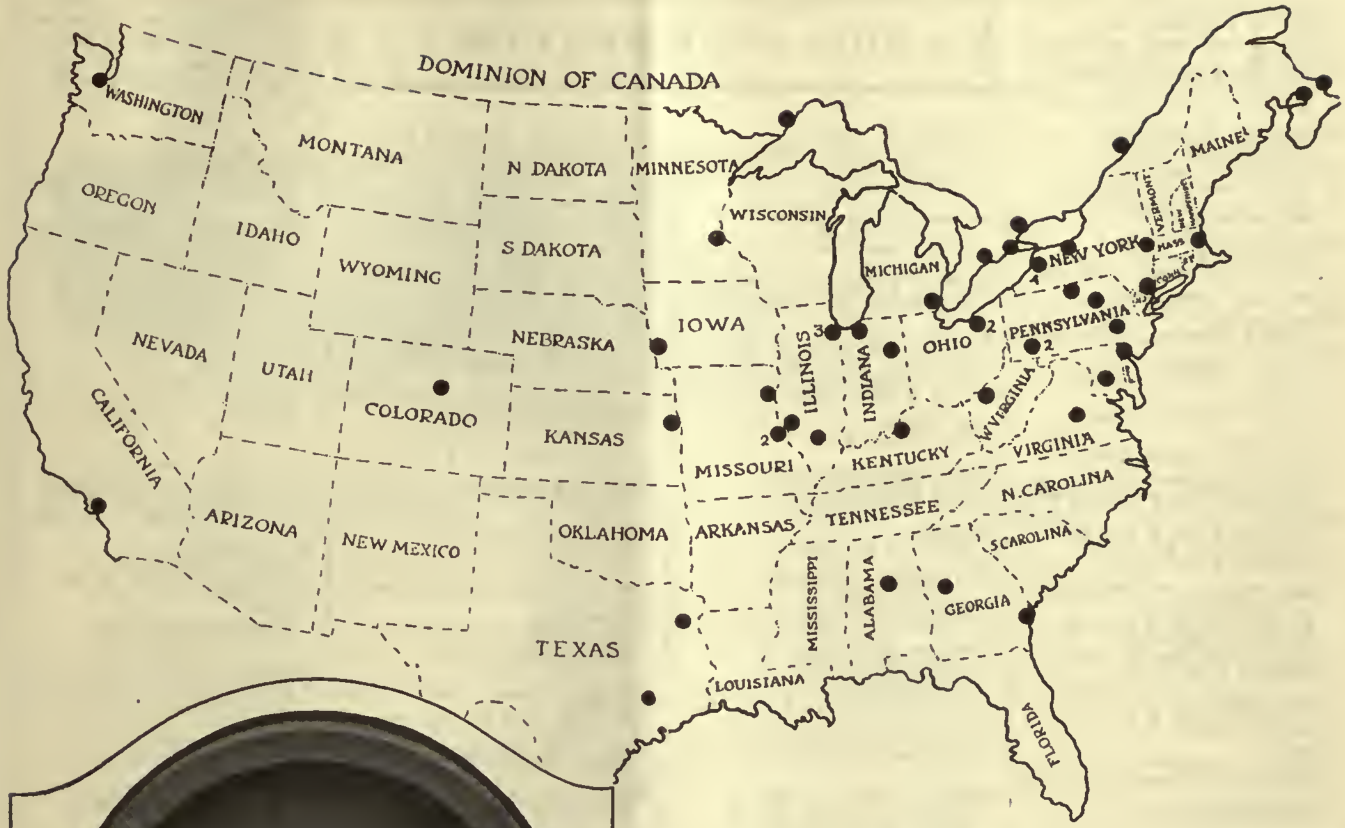
Electrically Operated Switches (Air or Oil)
Condit Electrical Mfg. Co.

Engineers, Consulting, Contracting and Operating
Allison & Co., J. E.
Archbold-Brady Co.
Arnold Co., The
Beeler, John A.
Clark Management Corp., E. W
Day & Zimmermann, Inc.
Drum & Co., A. L.
Fenstel, Robert M.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Englehardt W.
Jackson, Walter
Parsons, Klapp, Brinkerhoff & Douglas
Richey, Albert S.
Sanderson & Porter
Smith & Co., C. E.
Stone & Webster

Engines, Gas, Oil and Steam
Westinghouse Elec. & Mfg. Co.

Expansion Joints, Track
Wharton, Jr. & Co., Inc., Wm

Fare Boxes
Cleveland Fare Box Co.
Johnson Fare Box Co.
National Railway Appliance Co.
Ohmer Fare Register Co.



Where CHILLED IRON WHEELS

are made for Railway and Street Car Service

Capacity 20,000 per day
25,000,000 in Service

49 *The map above shows the location of the 49 foundries in the United States and Canada, represented by the Association of Manufacturers of Chilled Car Wheels*

Chicago 3
St. Louis 2
Buffalo 4
Pittsburg 2
Cleveland 2
Amherst N.S.
Montreal
Mich. City, Ind
Louisville
Mt Vernon, Ill
Ft. Wayne. Ind
Birmingham
Atlanta
Savannah

Boston
Detroit
St. Paul
Kansas City. Kan
Denver
Tacoma
Rochester, N.Y.
Sayre, Pa
Berwick. Pa.
Albany
Toronto
New Glasgow N.S
Madison, Ill.

Huntingdon W Va
Wilmington, Del
Houston, Tex
Hannibal Mo
Reading. Pa
Baltimore
Richmond. Va
Ft. William, Ont
St. Thomas, -
Hamilton,
Ramapo, N.Y
Marshall. Tex
Los Angeles
Council Bluffs

AMERICAN RAILROAD ASSOCIATION STANDARDS

650 lb. wheel for 60,000 Capacity Cars
700 lb. wheel for 80,000 Capacity Cars
750 lb. wheel for 100,000 Capacity Cars
850 lb. wheel for 140,000 Capacity Cars

The Standard Wheel for Seventy Years

Association of Manufacturers of Chilled Car Wheels

1847 Mc Cormick Bldg.
CHICAGO

WHAT AND WHERE TO BUY

Feed Water Heating
Schutte & Koerting Co.

Fences, Woven Wire and Fence Posts
American Steel & Wire Co.
Camrbia Steel Co.
Midvale Steel & Ordnance Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Cleveland Fare Box Co.
Consolidated Car Fender Co.
Electric Service Supplies Co.
Root Spring Scraper Co.
Star Brass Works.

Fibre and Fibre Tubing
Continental Fibre Co.
Westinghouse Elec. & Mfg. Co.

Field Coils. (See Coils)

Filters, Water
Scaife & Sons Co., Wm. B

Flaxlinum Insulation
National Railway Appliance Co.

Floodlights
Electric Service Supplies Co.

Floor Plates
American Abrasive Metals Co.

Flooring Composition
American Mason Safety Tread Co.

Forgings
Columbia M. W. & M. I. Co
Standard Steel Works Co.
Williams & Co., J. H.

Frogs, Track. (See Track Work)

Fuses and Fuse Boxes
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.
Williams & Co., J. H.

Fuses, Refillable
Columbia M. W. & M. I. Co.
General Electric Co.

Gaskets
Power Specialty Co.
Westinghouse Traction Brake Co.

Gas-Electric Cars
General Electric Co.

Gas Producers
Westinghouse Elec. & Mfg. Co.

Gates, Car
Brill Co., The J. G.

Gear Blanks
Cambria Steel Co.
Midvale Steel & Ordnance Co.
Standard Steel Works Co

Gear Cases
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Westinghouse Elec. & Mfg. Co.

Gears and Pinions
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
National Railway Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.

Generating Sets, Gas-Electric
General Electric Co.

Generators
English Electric Co., Ltd.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Gongs. (See Bells and Gongs)

Greases. (See Lubricants)

Grinders and Grinding Supplies
Metal & Thermit Corp.
Railway Track-work Co.

Grinding Blocks and Wheels
Railway Track-work Co.

Guards, Cattle
American Bridge Co.

Guards, Trolley
Electric Service Supplies Co.
Ohio Brass Co.

Hacksaws
Gladium Co., Inc.

Harps, Trolley
Anderson M. Co., A. & J. M.
Bayonet Trolley Harp Co.
Electric Service Supplies Co.
Hensley Trolley & Mfg. Co
More-Jones Brass & Metal Co.
Nuttall Co., R. D.
Star Brass Works

Headlights
Electric Service Supplies Co
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

Headlining
Haskelite Mfg. Co.
Pantasote Co.

Heaters, Car (Electric)
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co
National Railway Appliance Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Cooper Heater Co.
Smith Heater Co., Peter

Heaters, Car (Stove)
Electric Service Supplies Co.
Smith Heater Co., Peter

Hoists and Lifts
Columbia M. W. & M. I. Co.
Ford-Chain Block Co.
Niles-Bement-Pond Co.
Yale & Towne Mfg. Co.

Hose, Bridges
Ohio Brass Co.

Hydraulic Machinery
Niles-Bement-Pond Co.
Watson-Stillman Co.

Injectors
Schutte & Koerting Co.

Instruments, Measuring, Testing and Recording
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Insulating Cloth, Paper and Tape
Anchor Webbing Co.
General Electric Co.
Hope Webbing Co.
Westinghouse Elec. & Mfg. Co.

Insulating Machinery
American Insulating Machinery Co.

Insulation. (See also Paints)
Anderson M. Co., A. & J. M.
Electric Ry. Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Insulators. (See also Line Material)
Anderson M. Co., A. & J. M.
Creaghead Engineering Co.
Electric Railway Equipment Co
Electric Service Supplies Co.
Flood City Mfg. Co.
General Electric Co.
Macallen Co., The
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Insulator Pins
Electric Service Supplies Co.
Hubbard & Co.

Inventions Developed & Perfected
Peters & Co., G. D.

Jacks. (See also Cranes, Hoists and Lifts)
Buckeye Jack Mfg Co.
Columbia M. W. & M I. Co
National Ry. Appliance Co.
Watson-Stillman Co.

Joints, Rail
American Chain Co., Inc.
Zelnicker Supply Company Inc Walter A.

Journal Boxes
Bemis Car Truck Co.
Brill Co., J. G.

Lamp Guards and Fixtures
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Lamps, Arc and Incandescent. (See also Headlights)
Anderson M. Co., A. & J. M.
General Electric Co.
National Electric Specialty Co.
Westinghouse Elec. & Mfg. Co.

Lamps, Signal and Marker
Nichols-Lintern Co.

Lanterns, Classification
Nichols-Lintern Co.

Lathe Attachments
Williams & Co., J. H.

Lathes, Car Wheel
Niles-Bement-Pond Co.

Leather Cloth
The Standard Textile Prods. Co.

Lightning Protection
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co
Westinghouse Elec. & Mfg. Co.

Line Material. (See also Brackets, Insulators, Wires, etc.)
Anderson M. Co., A. & J. M.
Archbold Brady Co.
Columbia M. W. & M. I. Co.
Creaghead Eng. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
English Electric Co., Ltd.
General Electric Co.
Hubbard & Co.
Macallen Co., The
More-Jones Brass & Metal Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Locking Spring Boxes
Wharton, Jr. & Co., Inc., Wm.

Locomotives, Electric
General Electric Co.
McGuire-Cummings Mfg. Co.
Westinghouse Elec. & Mfg. Co

Lubricating Engineers
Galena-Signal Oil Co.

Lubricants, Oil and Grease
Borne, Scrymser Co.
Galena-Signal Oil Co.

Lumber. (See Poles, Ties, etc.)

Machine Tools
Columbia M. W. & M. I. Co.
Niles-Bement-Pond Co.
Watson-Stillman Co.

Manganese Steel, Special Track Work
Wharton, Jr. & Co., Inc., Wm.

Meters. (See Instruments)
Electric Service Supplies Co

Mica
Macallen Co., The

Motor Buses
Republic Truck Sales Corp.
Trackless Transportation Co.

Motormen's Seats
Brill Co., J. G.
Electric Service Supplies Co.
Wood Co., Chas. N.

Motors, Electric
General Electric Co.
Westinghouse Elec. & Mfg. Co

Motor and Generator Sets
General Electric Co.

Nuts and Bolts
Barbour-Stockwell Co.
Bemis Car Truck Co
Columbia M. W. & M. I. Co.
Hubbard & Co.

Ohmmeters
Weston Elec'l Instrument Co

Oil Burning Equipment
Schutte & Koerting Co.

Oil Circuit Breakers
Condit Electrical Mfg. Co.

Oils. (See Lubricants)

Omnibuses
Trackless Transportation Co.

Packing
Power Specialty Co.
Westinghouse Traction Brake Co

Paints and Varnishes for Woodwork
National Ry. Appliance Co.

Paving Bricks, Filler & Stretcher
Nelsonville Brick Co.

Paving Material
American Brake Shoe & Fdry. Co
Nelsonville Brick Co.

Pickups, Trolley Wire
Electric Service Supplies Co.
Ohio Brass Co.

Pinion Pulleys
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.

Pinions. (See Gears)

Pins, Case Hardened, Wood and Iron
Bemis Car Truck Co.
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Traction Brake Co

Pipe Fittings
Power Specialty Co.
Standard Steel Works Co.
Watson-Stillman Co.
Westinghouse Traction Brake Co

Planers. (See Machine Tools)

Pliers, Insulated
Electric Service Supplies Co.

Pole Reinforcing
Hubbard & Co.

Poles, Metal Street
Bates Expanded Steel Truss Co.
Electric Railway Equipment Co.
Hubbard & Co.

Poles, Ties Post, Piling & Lumber
Duncan Lumber Co.
Page & Hill Co.
Southern Cypress Mfg. Assn.
Western Red Cedar Assn.

Poles and Ties Treated
Page & Hill Co.

Poles, Trolley
Anderson Mfg. Co., A. & J. M.
Bayonet Trolley Harp Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Nuttall Co., R. D.

Poles, Tubular Steel
Electric Railway Equipment Co.

Power Saving Devices
National Railway Appliance Co.

Pressure Regulators
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Pumps
Schutte & Koerting Co.
Watson-Stillman Co.

Punches, Ticket
Bonney-Vehslage Tool Co.
International Register Co., The
Wood Co., Chas. N.

Punching Machinery
Watson-Stillman Co.

Purifiers, Feed Water
Scaife & Sons Co., Wm. B

Rails
Cambria Steel Co.
Foster & Co., L. B.
Midvale Steel & Ordnance Co.

Rail Grinders. (See Grinders)

Railway Safety Switches
Westinghouse Elec. & Mfg. Co.

Rail Welding. (See Welding Processes
Foster & Co., L. B.
Zelnicker, Walter A., Supply Co., Inc.

Rattan
American Rattan & Reed Mfg. Co.
Brill Co., The J. G.
Electric Service Supplies Co
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Receptacles and Plugs
Horne Mfg. Co.

Registers and Fittings
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Ohmer Fare Register Co.
Rooke Automatic Register Co.

Reinforcement, Concrete
American Steel & Wire Co.

Repair Shop Appliances. (See also Coil Banding and Winding Machines)
Columbia M. W. & M. I. Co
Electric Service Supplies Co

Repair Work. (See also Coils)
Cleveland Armature Works
Columbia M. W. & M. I. Co
General Electric Co.
Westinghouse Elec. & Mfg. Co

Replacers, Car
American Chain Co., Inc.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co

Resistance, Grid
Columbia M. W. & M. I. Co

Resistance, Wire and Tube
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Retrievers, Trolley. See Catchers and Retrievers, Trolley)

Rheostats
General Electric Co.
Westinghouse Elec. & Mfg. Co

Rolled Steel Wheels
Cambria Steel Co.
Midvale Steel & Ordnance Co.

Roofing, Car
Pantasote Co.,
Haskelite Mfg. Co.

THE IMPERIAL OMNIBUS

A practical Motor-bus developed for trackless transportation.

Provide Passenger Cars—Not Freight Trucks!

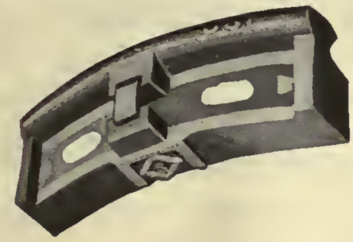
A motor truck chassis, designed to carry tons of rock or other inanimate freight, is scarcely the proper or suitable basis for conversion to a passenger conveyance. The prime considerations of safety and comfortable riding demand a low-center-of-gravity, wide-tread chassis, especially designed for passenger service. An adapted motor truck will not do. The Imperial Omnibus is the first automotive passenger bus designed and built in accordance with these requirements. The floor is only 26½ inches from the ground, when the bus is empty. The tread of the rear wheels is 71 inches.

Send for full details.

TRACKLESS TRANSPORTATION CORP., 300 Madison Ave., New York City
Originators of the Low Center of Gravity Omnibus

Brake Shoes
A. E. R. A. Standards

Diamond "S" Steel Back is the Best Type



Standard Patterns for

SAFETY CAR

D-67 for Narrow Treads
D-87 for Wide Treads

American Brake Shoe and Foundry Co.
30 Church Street, New York
332 So. Michigan Ave., Chicago Chattanooga, Tenn.

E A R L L

—The right retriever!

THERE is a special type of EARLL Trolley Catcher or Retriever for every type of service. Our business is making retrievers and catchers—nothing else. We have specialized in this particular field for your benefit. Consult us.

C. I. Earll York, Pa.

WHAT AND WHERE TO BUY

Sanders, Track
Brill Co., The J. G.
Columbia M. W. & M. I Co.
Electric Service Supplies Co.
Nichols-Lintern Co.
Ohio Brass Co.
St. Louis Car Co.

Sash Fixtures, Car
Brill Co., The J. G.

Scrapers, Track. (See Cleaners and Scrapers, Track)

Seating Materials
Brill Co., J. G.
Pantasote Co.
St. Louis Car Co.
The Standard Textile Prods. Co.

Seats, Car,. (See also Rattan)
American Rattan & Reed Mfg. Co.
Brill Co., The J. G.
Peters & Co., G. D.
St. Louis Car Co.

Second-Hand Equipment
Archer & Baldwin
Electric Equipment Co.
Foster Co., H. M.
Griswold Machine Co., G. M.
Transit Equipment Co.

Shades, Vestibule
Brill Co., The J. G.

Shovels
Hubbard & Co.

Shovels, Power
Brill Co., The J. G.

Side Bearings (See also Bearings, Center and Side)

Signals, Car Starting
Consolidated Car Heating Co.
Electric Service Supplies Co.
National Pneumatic Co., Inc.

Signals, Indicating
Nichols-Lintern Co.

Signal Systems, Block
Electric Service Supplies Co.
Nachod Signal Co., Inc.
Union Switch & Signal Co.
U. S. Electric Signal Co.
Wood Co., Chas. N.

Signal Systems, Highway Crossing
Nachod Signal Co., Inc.
U. S. Electric Signal Co.

Slack Adjusters. (See Brake Adjusters)

Sleet Wheels and Cutters
Anderson Mfg. Co., A. & J. M.
Bayonet Trolley Harp Co.
Columbia M. W. & M. I. Co.
Electric Railway Equipment Co.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.

Smokestacks, Car
Nichols-Lintern Co.

Snow-Plows, Sweepers and Brooms
American Rattan & Reed Mfg. Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Consolidated Car Fender Co.
McGuire-Cummings Mfg. Co.

Soldering and Brazing. (See Welding Processes and Apparatus.)
American Steel & Wire Co.
Lackawanna Steel Co.

Spikes
Amer. Steel & Wire Co.

Splicing Compounds
Westinghouse Elec. & Mfg. Co.

Splicing Sleeves. (See Clamps and Connectors)

Spray Nozzles
Schutte & Koerting Co.

Springs, Car and Truck
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Fort Pitt Spring & Mfg. Co.
Standard Steel Works Co.
Taylor Electric Truck Co.

Sprinklers, Track and Road
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Steps, Car
American Abrasive Metals Co.
American Mason Safety Tread Co

Stokers, Mechanical
Babcock & Wilcox Co.
Westinghouse Elec. & Mfg. Co.

Storage Batteries. (See Batteries, Storage)

Strand
Copper Clad Steel Co.
Roebling's Sons Co., J. A.

Superheaters
Babcock & Wilcox Co.
Power Specialty Co.

Sweepers, Snow. (See Snow Plows. Sweepers and Brooms)

Switch Stands
Ramapo Iron Works

Switches, Selector
Nichols-Lintern Co.

Switches, Track. (See Track, Special Work)

Switches and Switchboards
Anderson Mfg. Co., A. & J. M
Condit Electrical Mfg. Co.
Cutter Co.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Tapes and Cloths. (See Insulating Cloth, Paper and Tape)

Telephones and Parts
Electric Service Supplies Co.

Testing Instruments. (See Instruments, Electrical Measuring Testing, etc.)

Thermostats
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co
Railway Utility Co.
Smith Heater Co., Peter

Thread-Cutting Tools
Williams & Co., J. H.

Ticket Choppers and Destroyers
Electric Service Supplies Co.

Ties, Mechanical
Dayton Mechanical Tie Co.

Tie Plates
Cambria Steel Co.
Midvale Steel & Ordnance Co.

Ties and Tie Rods, Steel
American Bridge Co.
Barbour-Stockwell Co.
International Steel Tie Co.

Ties, Wood Cross. (See Poles, Ties, Posts, etc.)

Tongue Switches
Wharton, Jr. & Co., Inc., Wm.

Tool Holders
Williams & Co., J. H.

Tool Steel
Cambria Steel Co.
Carnegie Steel Co.
Midvale Steel & Ordnance Co.

Tools, Track and Miscellaneous
Advance Tool & Mfg. Co.
American Steel & Wire Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Hubbard & Co.
Railway Track-work Co.

Tools, Thread Cutting
Williams & Co., J. H.

Towers and Transmission Structures
American Bridge Co.
Archbold-Brady Co.
Bates Expanded Steel Truss Co
Westinghouse Elec. & Mfg. Co.

Trackless Vehicles
Trackless Transportation Co.

Track, Special Work
Barbour-Stockwell Co.
Ramapo Iron Works
St. Louis Frog & Switch Co
Wharton Jr. & Co., Inc., Wm.

Transfer Issuing Machines
Ohmer Fare Register Co.

Transfer Tables
American Bridge Co.
Archbold Brady Co.

Transfers. (See Tickets)
Archbold-Brady Co.

Transformers
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Treads, Safety, Stair, Car Step
American Abrasive Metals Co.
American Mason Safety Tread Co.

Trolley Bases
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
National Railway Appliance Co
Nuttall Co., R. D.
Ohio Brass Co.

Trolley Bases, Retrieving
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
More-Jones Brass & Metal Co
National Ry. Appliance Co.
Nuttall Co., R. D.
Ohio Brass Co.

Trolley Material
Flood City Mfg. Co.
Ohio Brass Co.

Trolleys and Trolley Systems
Ford Chain Block Co.

Trolley Shoes
Holden & White, Inc.

Trolley Wheels. (See Wheels, Trolley)

Trolley Wheel Bushings
Flood City Mfg. Co.

Trolley Wheel and Harps
Flood City Mfg. Co.

Trolley Wire
American Electrical Works
American Steel & Wire Co
Anaconda Copper Mining Co.
Copper Clad Steel Co.
Roebling's Sons Co., John A

Trucks, Car
Bemis Car Truck Co.
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.
Taylor Electric Truck Co.

Turbines, Steam
General Electric Co.
Terry Steam Turbine Co.
Westinghouse Elec. & Mfg. Co.

Turnstiles
Perey Mfg. Co., Inc.

Upholstery Materials
American Rattan & Reed Mfg. Co

Valves
Ohio Brass Co.
Schutte & Koerting Co
Westinghouse Traction Brake Co

Varnishes. (See Paints, etc.)

Ventilators, Car
Brill Co., The J. G.
National Railway Appliance Co
Nichols-Lintern Co.
Railway Utility Co.
St. Louis Car Co.

Vises, Pipe
Williams & Co., J. H.

Water Softening and Purifying Systems
Scaife & Sons Co., Wm. B.

Welded Rail Joints
Ohio Brass Co.

Welding Processes and Apparatus
Electric Railway Improvement Co.
General Electric Co.
Metal & Thermit Corp.
National Ry. Appliance Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co

Welders, Portable Electric
Electric Railway Improvement Co.
Ohio Brass Co.

Wheel Guards. (See Fenders and Wheel Guards)

Wheel Grinders
Wheel Truing Brake Shoe Co.

Wheel Presses. (See Machine Tools)

Wheels, Car, Cast Iron
Assn. Mfgrs. Chilled Car Wheels

Wheels, Car, Steel and Steel Tired
American Steel Foundries
Standard Steel Works Co.

Wheels, Trolley
Anderson Mfg. Co., A. & J. M
Bayonet Trolley Harp Co.
Columbia M. W. & M. I. Co.
Electric Railway Equipment Co
Electric Service Supplies Co.
General Electric Co.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.
Star Brass Works

Whistles, Air
General Electric Co.
Ohio Brass Co.
Westinghouse Traction Brake Co

Wire Rope
American Steel & Wire Co.
Roebling's Sons Co., John A

Wires and Cables
American Elec'l Works
American Steel & Wire Co
Anaconda Copper Mining Co.
Copper Clad Steel Co.
General Electric Co.
Kerite Insulated Wire & Cable Co
Roebling's Sons Co., John A.
Westinghouse Elec. & Mfg. Co.

Wrenches
Williams & Co., J. H.

Car Seating, Broom and Snow Sweeper
Rattan, Mouldings, etc.
AMERICAN RATTAN & REED MFG. CO.
Brooklyn, N. Y.
AMERICAN means QUALITY
RATTAN SUPPLIES OF EVERY DESCRIPTION

HORNE MANUFACTURING CO.
Mercer and Colgate Streets, Jersey City, N. J.
Hand Brakes—Air Purifiers for Compressors—Lighting Fixtures—Electric Vibrating Bells—Thermostats—Switches, Receptacles and Plugs—Junction Boxes, Portables and Reflectors.

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50 Church St. NEW YORK
DETECTIVES
Street Railway Inspection
131 State St. BOSTON

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—where most buyers look

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Annual Convention Number

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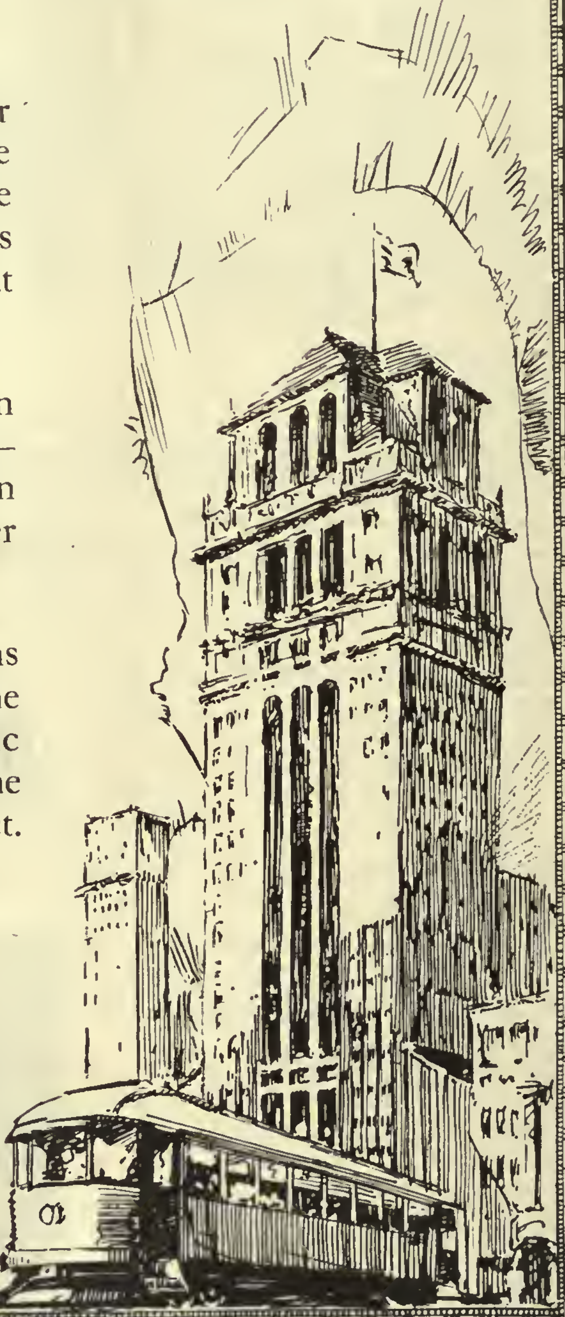

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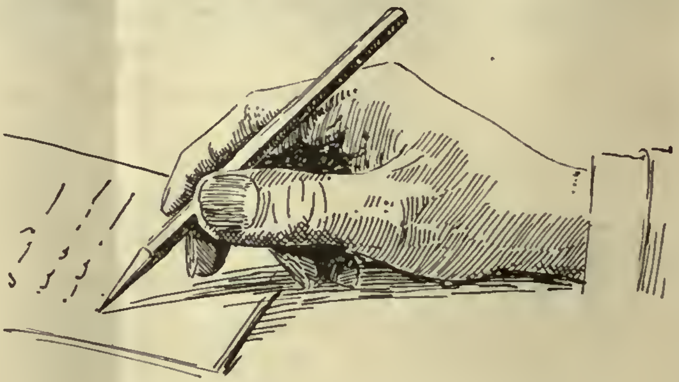

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The Peter Witt Car is the ideal type for heavy traffic service where large capacity cars on short headway are required.

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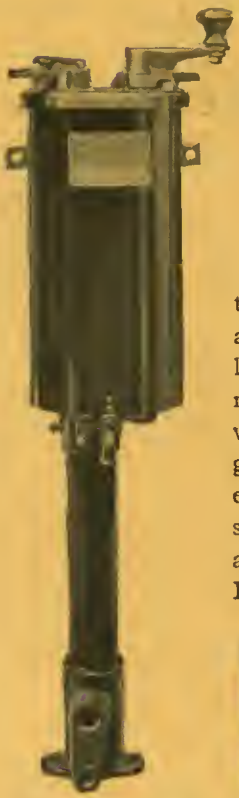

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Vol. 58, *No.* 11 New York, September 10, 1921 *Pages* 385-424

Electric Railway Journal

Henry W. Blake and **Harold V. Bozell**, Editors **Henry H. Norris, Managing-Editor**

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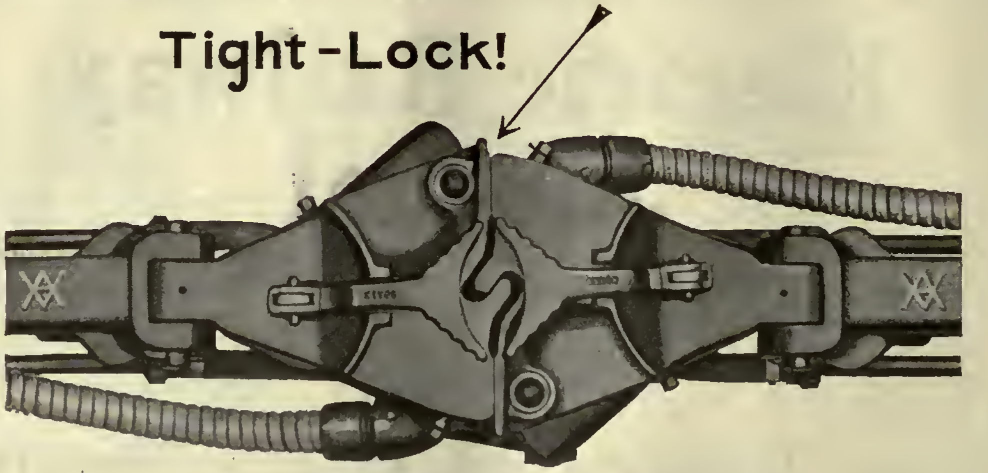

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Bridgeport Brass Company
Bridgeport Connecticut

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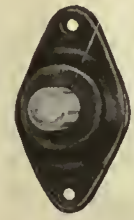
ELECTRIC SERVICE SUPPLIES CO.
PHILADELPHIA – CHICAGO – NEW YORK

No. 22181 Resistance Panel

No. 21022 Single Stroke Bell



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Type D Push Button

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Stop!
— say it with
Faraday

High Voltage Car Signals

The dependability of Faraday Car Signals shows in the number of repeat orders we are continually taking care of. Two hundred new safety cars now under construction for the Detroit Municipal Railway are being equipped with Faraday Signals after a successful tryout in other cars operated by this company.

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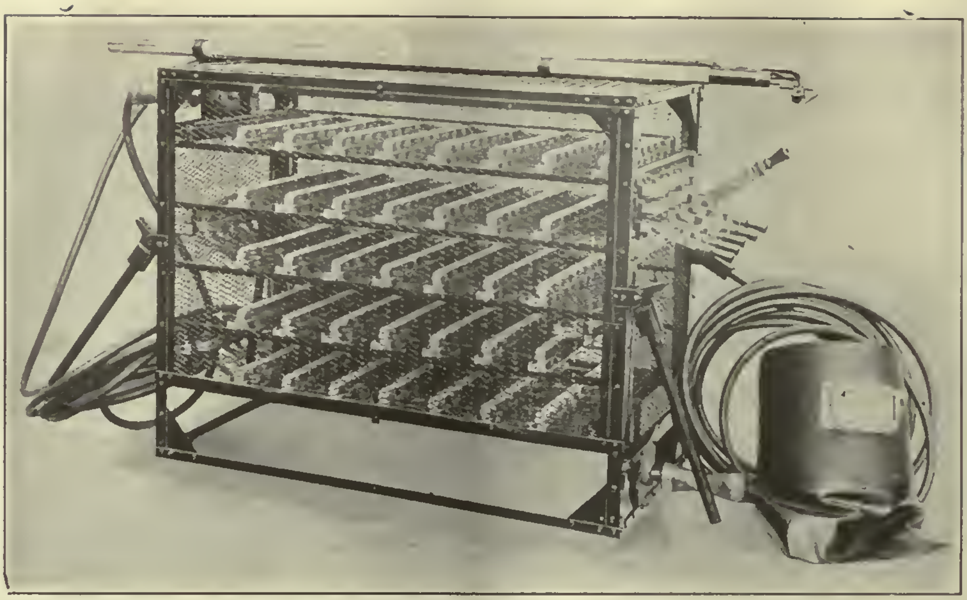

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the practical electric welder for the track crew

The Ajax Electric Arc Welder was designed and built to meet the frequently expressed demand of maintenance engineers for a light, rugged and simplified equipment, which could be successfully handled by virtually unskilled track labor.

Note its principal points of superiority. First, it is light—weight only 140 lbs., and measures 18 in. x 28 in. x 36 in. It is easily carried by two men using the conveniently provided handles. Can be placed on any ordinary car platform, thus eliminating need for special work-car or auto truck.

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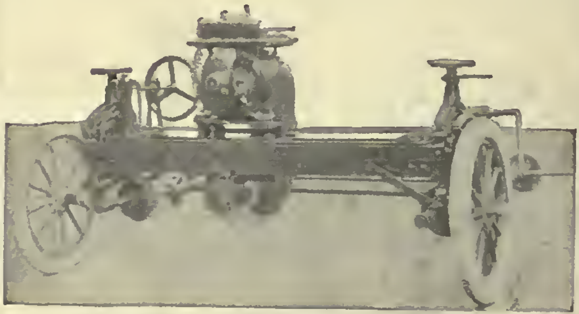
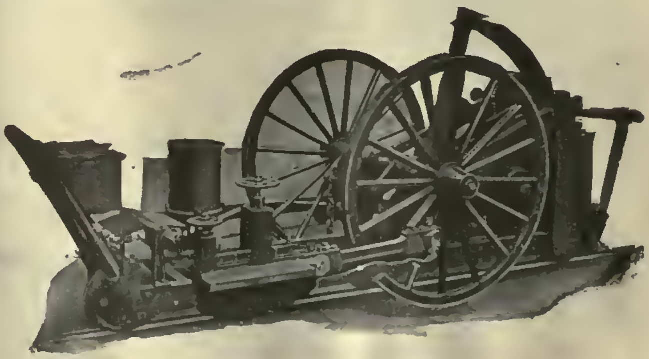


Universal Rotary Track Grinder



Reciprocating Track Grinder

FUNDAMENTAL ECONOMY

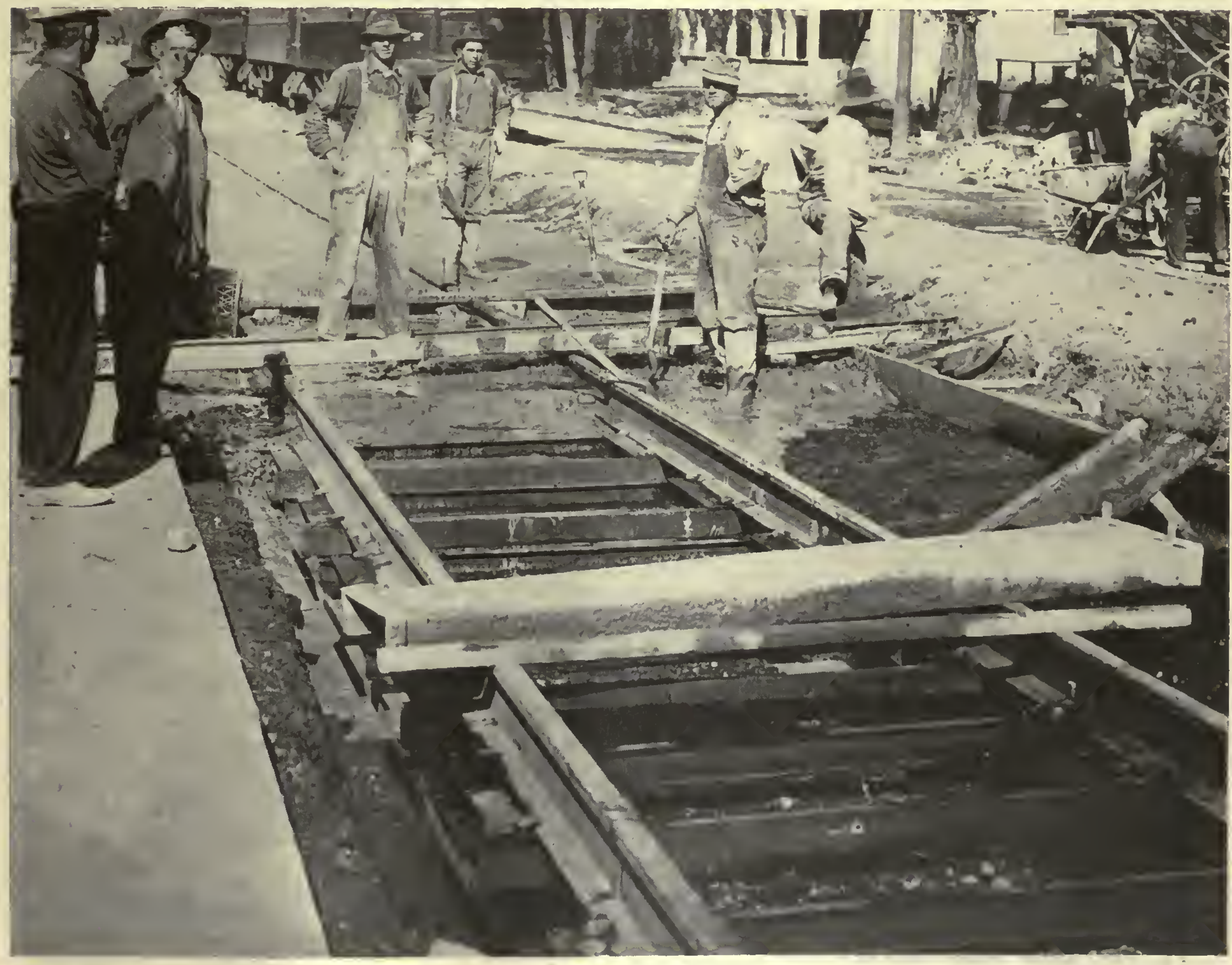
WHEN track economy is based on correct engineering principles practically applied it may be said to be fundamental.

The economy of STEEL TWIN TIE TRACK is based on the correct engineering principle of the most efficient distribution of steel to the work a tie must do in track. It is therefore fundamental economy.

When better track for less money seems worthy of your attention let us help apply this principle to your job.

THE INTERNATIONAL STEEL TIE COMPANY, Cleveland, Ohio

International Steel Twin Ties manufactured and sold in Canada by Sarnia Bridge Co., Ltd., Sarnia, Ont.



Steel Twin Tie Track

"An ideal lubricant for this particular service"

Results obtained in this test can be duplicated on your property

Mr. J. K. Tuthill, Research Associate in Railway Engineering with the University of Illinois, recently made a test of Tulc on a 30-ton test car over a 2,000 mile run. A resume of this test is contained in the following extract from a letter written by Mr. Tuthill:

> "When we started operating our Test Car last fall, we were troubled with hot journal bearings due perhaps to faulty lubrication, and defective journal brasses. As we were expecting to make a series of bond tests for the Illinois Traction Company, we decided to lubricate the car throughout with TULC. All journal brasses were renewed and all bearings properly packed under the supervision of your Mr. H. H. Lytle.
>
> "Our test was started March 14th and ended April 20, 1921. The car was operated at a speed of from 10 to 30 miles per hour while testing, and from 30 to 60 miles per hour when moving over the road from one point to another. During this period the car ran about 2000 miles and tested 500 miles of track.
>
> "The bearings were watched to see if any heating occurred and after a three hour steady run the axles were just warm and not hot enough to be uncomfortable to the hand when laid upon them. A motor armature was taken out and the bearing and shaft surfaces were found to be bright and smooth. During this test period it was observed that the car did considerable coasting; on one occasion during an eight-hour run the car coasted 63 minutes of this time.
>
> "We found that TULC for the use we put it to on our 30 Ton Test Car equipped with four 50 H.P. motors gave us better results than we expected and appeared to be *an ideal lubricant for this particular service.*
>
> "We wish to thank you and your Mr. H. H. Lytle for the many helps and suggestions given us."

Tulc will accomplish similar results on your property. Write today for complete data.

"Overall Specialists"

The service men who work with you on your lubricating problems are not "experts on theories." They put on overalls and get right down to brass tacks—pack your cars—show you how and why Tulc should be used. They get results—real money saving results—99 times out of a hundred. The hundredth time there is no charge for the service.

The Universal Lubricating Co.

Offices: Schofield Bldg. Works: Sweeney Ave.

Cleveland, Ohio

TULC

A LUBRICANT

—scientifically and accurately compounded to reduce lubricating costs

Modernize! *Pneumatize!*

All the World's Doing It!

The pneumatized, more-miles-per-hour and more-money-per-hour car has crossed the oceans east and west.

It's proof that, in these post-war days, American inventiveness is appreciated everywhere, from Europe to Australia.

But pleased as we are to receive orders for the National Pneumatic line from overseas, we know that there are still many splendid opportunities on this continent.

If you are one of those who have not yet begun to pneumatize and so, in a large measure, to *modernize* your rolling stock to meet the requirements of this automatic age, we should be glad to show you what can be done with one or all of these appliances for Greater Speed, Bigger Revenue, Better Relations and Uttermost Safety.

National Pneumatic

Door and Step Control
Safety Interlocking Door Control
Door and Step Operating Mechanisms
Motorman's Signal Lights
Multiple Unit Door Control

Manufactured in Canada by
Dominion Wheel & Foundries, Ltd.
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Ten years of melting snow and heavy rains

—rushing with a violence that only a mountainous district can produce, have caused no damage to this sturdy 48-inch Armco Culvert. Year after year, in all parts of the country, hundreds of Armco Culverts, subjected to the deteriorating action of all kinds of soil and climate, are duplicating this record of service.

If only one Armco Culvert had given so many years of service, their enduring qualities might be questioned, but when thousands of them show not the slightest sign of deterioration after ten or more years of service, the rust-resisting and enduring qualities of Armco Ingot Iron are proven beyond the shadow of a doubt.

The increasing use of Armco Culverts by experienced engineers and Highway Commissioners is authentic approval of their ease of installation and enduring qualities.

TRADE MARK ARMCO Resists Rust Ingot Iron

There is a manufacturer in nearly every state, and in Canada, making genuine rust-resisting ARMCO CULVERTS and other products of Armco Ingot Iron such as flumes, siphons, tanks, road signs, roofing, etc. Write for full information and nearest shipping point on products in which you are interested.

ARMCO CULVERT & FLUME MFRS. ASSN.

215 NORTH MICHIGAN AVE. CHICAGO

The World's best Lubricants

GALENA QUALITY

Weighed in the Scales of Service

Lubricating oils may be measured in gallons, but *lubrication* can be correctly measured only by the gauge of *service rendered*.

Lubricating value can be secured from oils in the same proportion that it is carried in their physical make-up—and no more.

Figuring lubrication costs by gallonage prices of oil is on a par with figuring efficiency in employees by their avoirdupois.

Galena Oils are the products of years of experience in the requirements of railway lubrication. Only the highest grade stocks enter into the special process of their manufacture. It is *quality* that endows them with ability to carry their lasting, protective film and render in mileage double the service of ordinary oils.

In the scales of *Service* the weight of Galena superiority is quickly evident. On hundreds of electric railways these oils are proving the truth of the assertion: "It is not the gallon of oil, but the lubrication units the gallon contains—that count!"

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G S O C
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Galena Quality Is Our Bond
and Your Security!

THE GALENA-SIGNAL OIL CO.
NEW YORK FRANKLIN, PA. CHICAGO
Offices in all principal American Cities
LONDON BUENOS AIRES PARIS

GALENA SERVICE

A little care and forethought in selecting the carbon brush for your motors will be repaid by the absence of commutator troubles

Which Brush for Your Motors?

Picking brushes for motors is a good deal like selecting shoes—some fit and some do not and not every style will suit each individual wearer.

A large proportion of commutation troubles are directly traceable to improper brushes—not necessarily poor quality but a grade not suited to conditions.

G-E carbon brushes are made in grades to suit every type of motor and every operating condition. G-E brush specialists will study your needs and prescribe exactly the brush for maximum satisfaction and economy. Their services are at your command.

G-E Brushes maintain the "Original Equipment Quality" of G-E Motors.

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Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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A West Virginia Railway Power-Plant Pump House on Stilts

SO IMPORTANT in power plants is the provision of ample and reliable supply of condenser circulating water that in many if not in most cases the location of the plant is determined largely with reference thereto. In examining a plant, therefore, among the first questions asked by the observing engineer are those referring to this feature.

In the design and construction of condensing-water systems many items have been standardized and have therefore become commonplace to engineers, but in each worth-while plant there are outstanding novelties that repay careful study. An example is furnished by the improvements recently completed in the power plant at Kenova, W. Va., which furnishes power to the Ohio Valley Electric Railway. These improvements are covered in some detail in an article in this issue. Here the supplying of water in sufficient volume was complicated by the distance of the power house from the natural source, the neighboring Big Sandy River, and the considerable elevation of the station above the river. Worse yet, the river is subject to annual floods, and the bank where the pumping plant would need to be placed, if the river water was to be utilized, is quicksand to a considerable depth. Previously the circulating water was cooled near the plant by means of ponds, but when forced to secure more water and cooler water the engineers "took the bull by the horns" and designed a plant for erection on the bank. They had to do some careful planning to insure satisfactory results.

The first consideration involved in the design was reliability. To get this meant that the machinery used must be simple and rugged. Induction motors of the slip-ring type met these specifications, as did also centrifugal pumps located under low-water level and direct-connected to the pumps. Of course the motors had to be placed above high-water level. The weight-carrying bearings, one to each unit, were incorporated in the motor frames and are thus always accessible. Reliability was further assured by the provision of duplicate units, and by retaining the former cooling ponds for emergency use.

The other main design factor was sufficiency of supply. This was insured by the use of liberal motor and pump capacities and by installing pipe lines of large cross-section.

Referring further to the structural difficulties imposed by flood and quicksand conditions, it will be noted that the structure had not only to be placed on a solid footing but it had also to be made strong to resist the surge of the water. Provision had, in addition, to be made against erosion of the bank on which the foundation was placed. These facts need to be held in mind as the account of the actual construction is read, in order that the real lesson of the story may be appreciated. The unusual form of the structure which is consequent upon these facts then appears to be a logical one.

In the article already referred to, attention was properly focussed upon the pump house. There is, however, a physically inconspicuous structure located part way between the pump and power houses which should not be overlooked. This is the sealing well. It is the terminal of the draft pipe from the condensers, its function being to insure the utilization of as much suction head as possible in the circulating system. Of course, all condensers have draft tubes, which have to be sealed, but the form which this one takes is a little out of the ordinary. The sealing well is of further interest as the possible future source of water for the neighboring towns. That there would be ample water for this purpose can be seen from a simple calculation. Assume an average load of 10,000 kw. on the plant for twenty-four hours per day. Then if each kilowatt-hour requires 16 lb. steam and each pound of steam 40 lb. of condensing water, the total daily weight of water will be 154,000,000 lb. and its volume more than 19,000,000 gal. At 200 gal. per day this would provide water for 95,000 people, which is more than the population which will need to be served for some time to come. However, whether the sealing well ever becomes a source of water supply or not, it is performing an important, albeit simple, function.

The sealing well, the pump house, the pipe line, the spillway over which the waste water slips back into the river, and the auxiliary cooling ponds of the Kenova power plant, taken all together, form an equipment which is playing an important part in the reduction in coal consumption from more than 3 to 2 lb. per kilowatt-hour which has recently been accomplished. They represent money well invested.

Mr. Harkness Discusses New York Transit Situation

AS INDICATED last week, the affairs of the Interborough Rapid Transit Company in New York City were again placed in a critical situation by the application for a receivership. Another factor which enters into this situation and which ultimately will probably have a greater influence than anything else, not only on the solution of the difficulties of the Interborough but on the whole New York City traction situation, is the impending report of the New York Transit Commission. This report is expected about Sept. 15, and while there is no official indication as to the nature of its contents and recommendations, the remarks of one of the members, LeRoy T. Harkness, before the American Bar Association at Cincinnati doubtless is an indication of the attitude of the commission.

Mr. Harkness' statement presents what is probably as broad and impartial an analysis of the New York traction situation as has ever been made. It treats candidly and frankly of a situation filled with complexities, and a long history of financial, engineering, social and political developments. The address is given in substantially complete form elsewhere in this issue, as it is believed that it will prove useful to railway men and men in public life who are interested in the solution of metropolitan transit problems any place in this country.

Mr. Harkness—and this probably means the entire commission—has not dealt lightly with either railway management or politician where he believes them to be at fault. Such candid and fearless studies and analyses of traction problems cannot but eventually result in equitable solutions even though that may entail some discomfiture and some radical measures in the process.

Present Indianapolis Difficulties Not Deep Seated

INDIANA having passed a law permitting utilities to surrender local franchises and place themselves entirely under the jurisdiction of the state public service commission with the authority of an indeterminate state permit, the Indianapolis Street Railway chose to exercise this option. All was well until the company had to ask the city to legislate the jitneys off the streets. Then the city, having no contract with the company, wanted to know what guarantee and what control of service it would have in return for removing this ruinous and acknowledged unfair competition. It wants the company to sign a contract restoring local control, at least as to matters other than valuations and rates of fare. It would thus appear that the plea of the company for elimination of the jitney is being used as an opportunity to force submission to what may be an undesirable contract.

Two thoughts are inspired by this situation. First, it brings out clearly the injustice of having the street cars subject to state regulation while jitneys are subject to city regulation and outside the jurisdiction of the state commission. What is manifestly unfair competition is beyond the power of the commission to remove or correct, and no regulation of the railway, however enlightened, can place it in a position adequately to serve the public and earn a fair return in the face of unregulated, irresponsible and practically tax-free jitney or bus competition.

If the two forms of transportation are desired by the public, they should be under the same regulating body, else there will inevitably be the clashes between company and regulating body added to clashes between regulating bodies, with politics on both sides. This is a situation that must be recognized. For if the unfair competition springing from such divided authority is permitted to continue long, the street railway will have to cease operation. Fortunately, the city council of Indiana's capital city seems to have a much better and fairer conception of the position of the street railway than did the council in Des Moines, and there is also a fuller appreciation of what a complete shut down of car service would mean to the city, so that it seems likely that the jitneys will be properly dealt with before the railway is forced to the extreme action that became necessary in the Iowa capital.

The second suggestion which naturally presents itself is with reference to the needlessness of the contention of the Indianapolis city council that the railway must contract again with the city in order to provide a working agreement that will avert the probability of an appeal to the state commission on every order that the city may make. This seems to be begging a point for an issue, for the city's rights and interests are amply protected without a contract. It always has the right to be heard before the commission, and certainly its arguments will have at least equal weight with those of the company.

Hence it would seem that with so slight a difference between the company and city and with such an apparently good understanding of the real transportation problem of today, the city council should not continue long to decline to relieve the street railway from the present unfair competition. Certain it is that whether the existence of unregulated jitney competition is due to indifference or willful retaliation of the city council or to divided regulation, or to some other reason, both forms of transportation cannot continue to exist in competition with each other in a business which is undeniably best handled as a monopoly. Some answer must be found soon, and this applies in practically all cities as well as in Indianapolis. And if the city officials are truly desirous that the decision made shall be for the best interests of the people of the city, there is no danger of a cessation of street car service.

Good Will the Main Object in Traffic Advertising

A MAN who is responsible for some of the most elaborate traffic advertising in the world was asked by a representative of this paper whether the expense justified the results. "If you mean whether the extra traffic brought in would pay for this advertising," he replied, "I will say no. But that is not the underlying reason for this publicity. We would keep it up if we didn't have room for another passenger. It is good will we are after in this work. Every person who has the problem of 'Where or how or when to go' settled for him by these advertisements is a better friend of ours than he was before we took an interest in his spare time. Whether a man goes to such and such a place or not or whether he personally needs that time-table data, we want him to feel on reading the poster that we are alive; that we are always thinking of his needs, present or future. We don't take the all-too-common attitude that the patron, whether regular or transient, knows the roadway and train designations as well as our own transportation staff. So we would rather do too much than do too little to guide the 'fare guest,' to use a happy German term for the person on whom our business existence depends."

This broad-minded view of traffic advertising is precisely that of the real business man in relation to his own products. He does not try to trace the sale of every pair of shoes to a specific advertisement. It is enough for him if the public acquires the idea that he is awake to the problems of the shoe user. There is good-will value in his advertising tennis shoes in summer and overshoes in winter, even if they sold themselves. So, too, the great mass of passengers who take their two rides a day unvaryingly may not need any time-tables, traffic posters, thorough destination signs or street stops, but every evidence they see of a desire to help the passengers who do need these aids goes down to that good-will account which can prove so helpful when fares are to be adjusted, accidents to be paid for or new contracts to be entered into with the community. Therefore, let not the advertising account be scanned too closely in relation to passenger increase, but rather let it be treated as a good-will account of intangible but undoubtedly high value to the well-being of the concern as a whole.

Novel Condenser Pump House

American Railways Power Plant at Kenova, W. Va., Recently Enlarged in Capacity, Now Derives Circulating Water from New Electrically Driven Centrifugal Pumps, Housed in a Structure Which Is Designed to Be Flood Proof

THE Ohio Valley Electric Railway, the headquarters of which are at Huntington, W. Va., draws its power supply from a plant located at Kenova, operated by the Consolidated Light, Heat & Power Company. Both of these properties are controlled by the American Railways Company, Philadelphia, Pa. Due to the rapidly increasing load on this power plant, which was originally designed by James Fagan, it has been necessary to make successive improvements within the past few years, one of the most notable of which has been the installation of a pumping plant for condenser circulating water on the bank of the Big Sandy River near the plant.

PUMPING PLANT FROM LAND SIDE IN FLOOD SEASON, SHOWING TRANSFORMERS IN POSITION ON BALCONY

PUMPING PLANT ON THE BANK OF THE BIG SANDY RIVER, WITH POWER PLANT IN DISTANCE

The increasing demand on the plant can be realized from the fact that its output is now 70,000,000 kw.-hr. per annum, as compared with 15,000,000 kw.-hr. eight years ago. The overload on the plant, in overtaxing the condensers due to their limited supply of cool condensing water, resulted in a coal consumption of about 3½ lb. per kilowatt-hour.

Due partly to the installation of the new condensing-water circulating equipment, the coal consumption has been cut down to about 2 lb., and it is estimated that the cost of the improvement, $150,000, will have been covered by the saving effected in about ten months of operation. A vacuum of from 28 to 29 in. referred to a 30-in. barometer can now be maintained.

POWER PLANT HAS AN ASSORTED EQUIPMENT

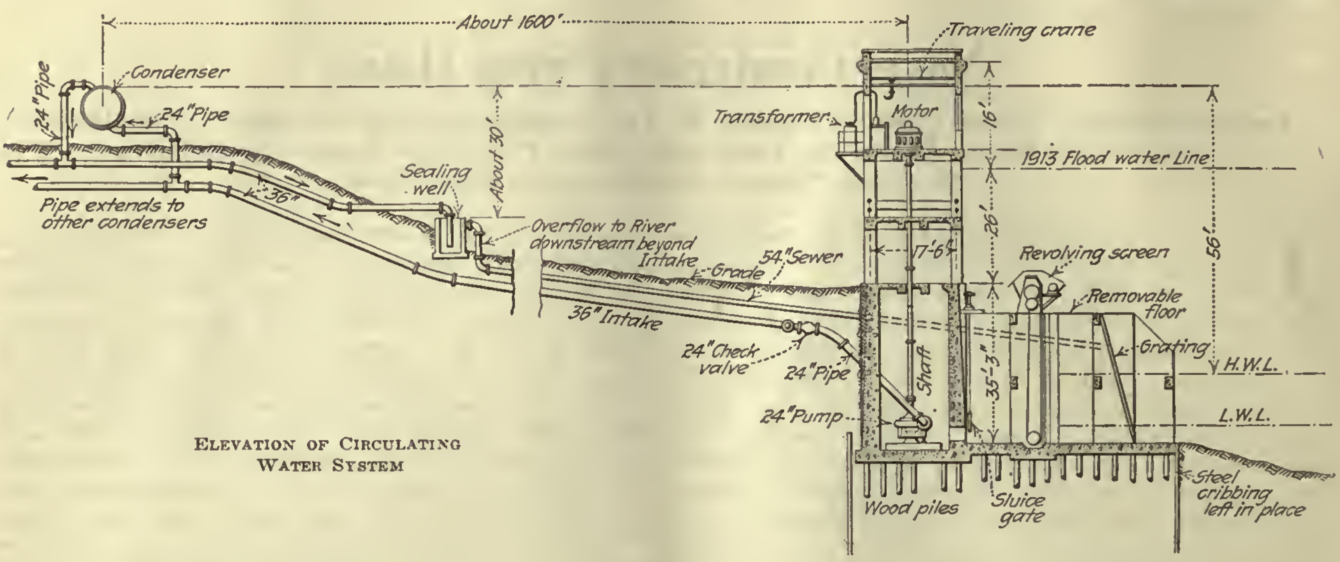
When this plant was taken over by the American Railways in 1910 the generating equipment in the station consisted of three 600-kw. and one 1,200-kw. cross-compound engine-driven generators, and the boiler equipment comprised four 400-hp. Altman-Taylor boilers and three 300-hp. vertical Berry boilers. The plant was operated with jet condensers, the condensing water being cooled in a pond. This was considered the most economical arrangement because when the power plant was originally installed various considerations dictated the wisdom of placing it about 1,600 ft. back from the Big Sandy, on an elevation well above high-water mark in the flood season. The river rises normally about 30 ft. each spring, the flood occurring in March or earlier. The record high water was that of 1913, when the rise was 40 ft. No spraying devices were used in connection with the pond in the original plant.

Shortly after the plant was taken over, two 1,000-kw. Allis-Chalmers turbines were put in, one being a high-pressure and the other a low-pressure machine. A spray system was installed in the pond, and an extension to the boiler house was built to house seven additional B. & W. boilers, three of which were used to replace the old Berry boilers.

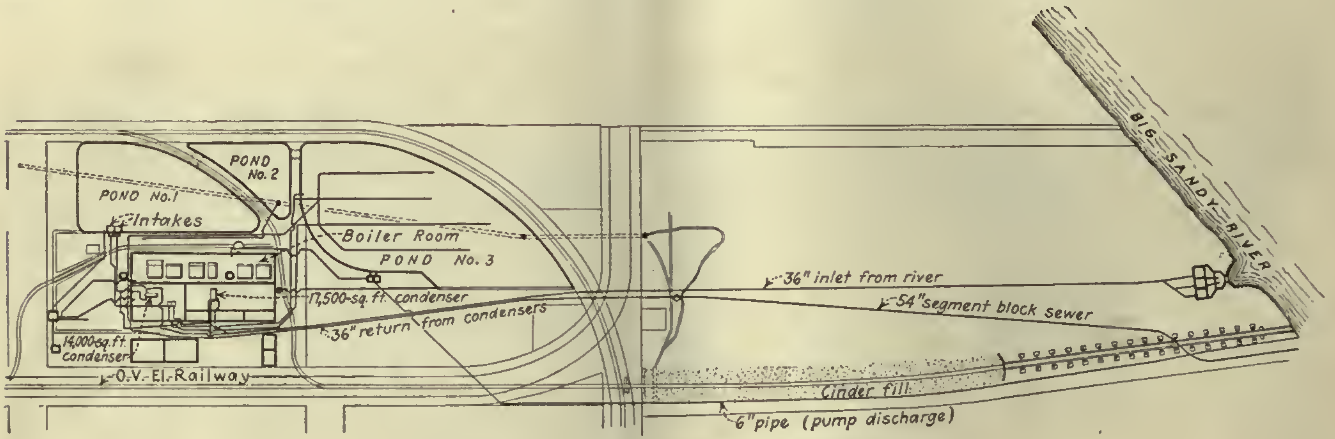
As soon as this equipment was installed the demand on the station increased so rapidly that it was decided to install a 7,500-kw. General Electric turbine with a surface condenser. When this unit was operated in connection with the spray pond, the load continuing rapidly to increase, it was found that the capacity of the pond had been exceeded.

Further, an additional generating unit was found necessary, and a 12,500-kva. (10,000-kw. at 80 per cent power factor) General Electric turbine was installed. This made absolutely necessary the increase in facilities for supplying circulating water and the decision was reached to install an electrically-driven pumping plant that would provide for future as well as immediate needs. The details of this are given in the following paragraphs and the accompanying illustrations.

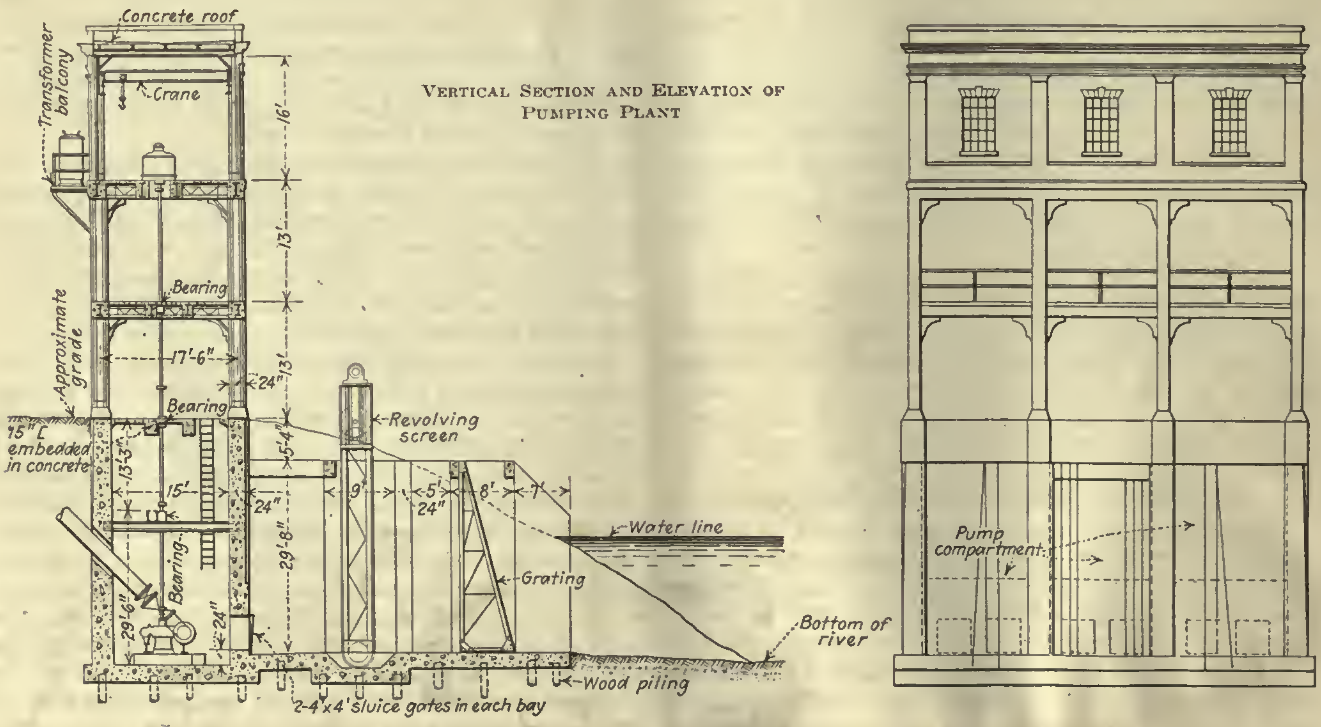
The new pumping plant displaces the old spray pond as far as the original purpose of the latter is concerned, but the pond is kept in good condition for emergency service, as a reserve against breakdown of the water main connecting the pumping station with



ELEVATION OF CIRCULATING WATER SYSTEM



OUTLINE PLAN OF CIRCULATING WATER SYSTEM



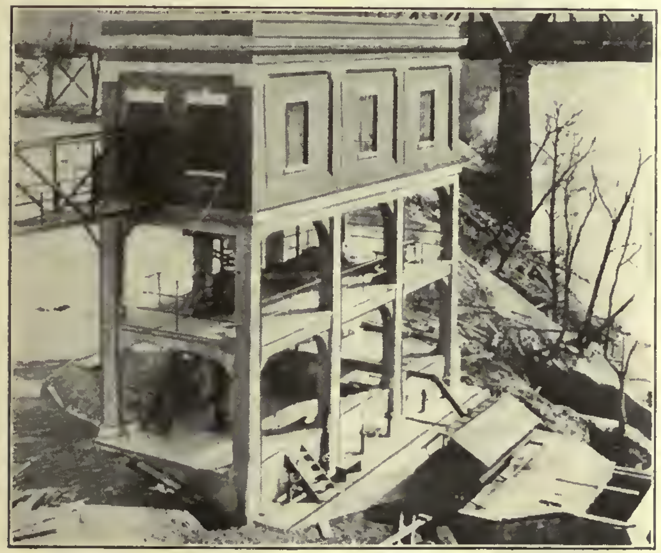
VERTICAL SECTION AND ELEVATION OF PUMPING PLANT

Cross Section **West Elevation**

the power plant. It also serves a purpose as a settling pond from which water can be taken for boiler-feed and other plant purposes, a desirable feature in view of the sediment contained in the Big Sandy River water.

In the boiler room two 1,000-hp. B. & W. boilers were installed to furnish the steam required for the increased turbine capacity. These are equipped with B. & W. superheaters and Westinghouse underfeed stokers. These boilers can be operated at 200 per cent above normal rating. Besides these boilers the plant now contains eleven other boilers of 400-hp. rating each, the total rated boiler capacity thus being 6,400.

Summing up the present turbine and engine installation it will be seen that it is somewhat assorted. Inherited from the early days are the 1,200-kw. cross-compound Wetherill-Corliss engine-driven unit and two 600-kw. units with Harrisburg Foundry & Machine Company engines, one of the 600-kw. units having been displaced. These three machines have General Electric generators. There are also the two 1,000-kw. Allis-Chalmers units, the low-pressure machine using exhaust steam. Jet condensers are used with these machines, which are called upon only in emergency. Finally, there are the newer 10,000-kw. and 7,500-kw. turbines with surface condensers.



CONSTRUCTION VIEW OF PUMP HOUSE, RIVER AT LOW LEVEL

FLOOD CONDITIONS A CONTROLLING FACTOR IN NEW PUMPING PLANT

Coming now to the new pumping plant, it may be said in general that it comprises a reinforced concrete structure to house ultimately three vertical, electrically driven pumping units, each of a capacity of 20,000 gal. per minute. Of these only two are installed at present. The pumps are set below low-water level and the motors above high-water level, considering the record rise of 1913. The construction of the plant was begun in October, 1918, and it was completed in the summer of 1919.

The structural steel-concrete structure has the form shown in the accompanying illustration, with the pump chamber floors well below river level, and the motor room high above, supported on substantial columns. The steel for the building is a complete structure in itself, although it is incased in concrete.

The structure rests on a sandy soil, and it was necessary to go down about 40 ft., nearly to bedrock, with the foundations, for the purpose of locating the pumps below low-water level and also to obtain a solid foundation for the whole structure. The foundation space was inclosed with sheet steel piling, which was necessary to keep out the quicksand during construction. After the excavation had been carried down to the depth mentioned, short wood piles were driven and a 27-in. concrete cap was cast over their tops.

In order permanently to prevent spreading of the quicksand, the sheet-steel piling was left in place, but was cut off by means of a gas torch so as to salvage all that was not needed for permanent use.

A MOTOR ROOM ON STILTS

Resting on the foundation are the walls for the three pump chambers and the intake, as well as the concrete-steel columns of the superstructure. The form of the walls is shown in the outline drawing reproduced. It will be noted that the walls of the intake are of irregular form. This was selected to give the maximum resistance to the earth pressure, as well as to accommodate the screens and gates. The pump chambers are roofed with concrete slabs, which also serve as a floor for the superstructure.

MOTOR ROOM, WITH SWITCHBOARD IN BACKGROUND

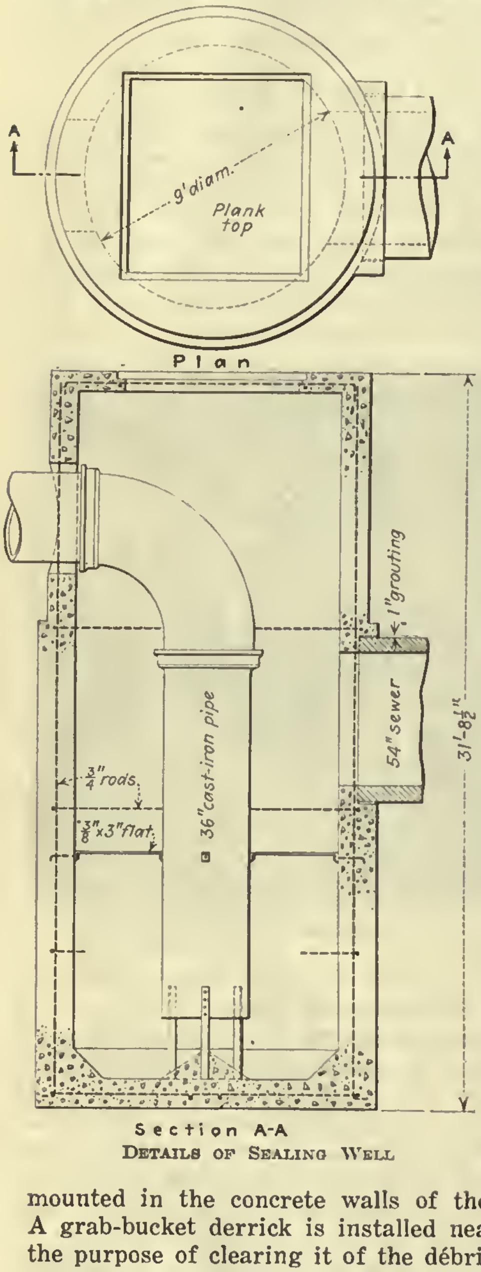
The columns supporting the motor house are of latticed-type section, incased in concrete. Lattice columns and girders were used because when they are incased in concrete the concrete forms a solid mass. This part of the structure was necessarily of open form to present a minimum of resistance to the floods. A floor was installed half way up to give access to the shaft steady bearings and to stiffen the columns.

Design features of this superstructure, in addition to economy in the use of materials, were (1) strength to resist floods, and (2) stiffness to prevent vibration from the motors set high above the foundation.

The motor house, built atop this novel support, is of attractive design, the architectural features having been determined by the fact that one of the railway company's lines passes over a viaduct within a hundred feet of the building. The walls, of brick, were built on a reinforced cap on the columns, with brick pilasters and terra cotta cornices for adornment.

The pumps, located well below low-water level on the floor of the pump pits, are of special design for their particular duty in this plant. Their speed is 600 r.p.m. and they have an "unloading characteristic," that is, the power which they demand is in direct proportion to the head. They are designed for a maximum head of 60 ft., although the usual working head will be about 40 ft., and an efficiency at full load of 82 per cent.

The location of the pumps under water insures water sealing at all times—in other words, they are self-priming. There is thus no danger of loss of water through leakage, an important feature as the pumps are so far from the power plant. Obviously, serious trouble in the condenser system would be caused by the pumps "losing water" or failing to start up the water circulation promptly. The flow of water to each pit is controlled by two 36-in. x 48-in. Newburgh sluice gates. These are watertight and they permit the closing off of a pit, so that the water can be pumped out to permit repairs to the pump. Near the mouth of the main intake is an inclined trash rack and in the intake to each pump pit is a traveling screen made by the Chain Belt Engineering Company. Each screen slides in guides formed of angle irons mounted in the concrete walls of the divided intake. A grab-bucket derrick is installed near the intake for the purpose of clearing it of the débris which at times accumulates in large quantities.



Details of Sealing Well

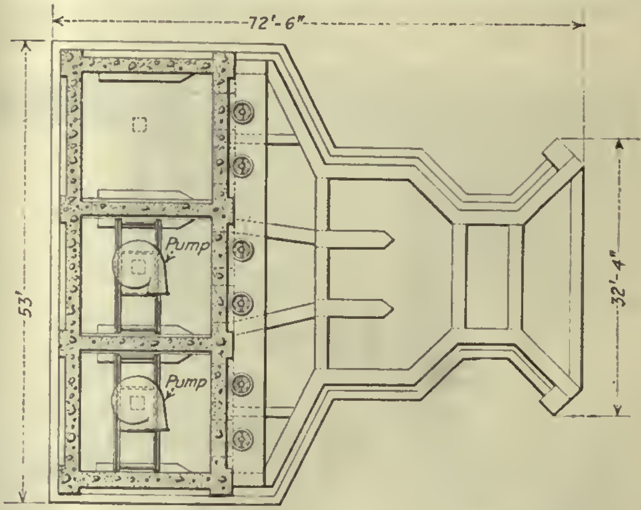
The motors driving the pumps are of the induction type, with slip rings to permit the insertion of starting resistance in the secondary circuit. Their synchronous speed is the rated speed of the pumps, 600 r.p.m., and their capacity 425 hp. each. They are supplied with power through a bank of three 200-kva., self-cooling, oil-cooled transformers, mounted on a bracket-supported balcony behind the motor house. In addition there is a bank of three 150-kva. transformers for emergency use. These lower the voltage of the three-phase current from the power house from 11,000 to 440. The switchboard controlling the motors and power circuits is located in the motor room near the wall next to the transformer balcony.

To facilitate repairs the motor room is equipped with an Alfred Box traveling hand-operated crane.

Rotating Parts Hang from One Bearing

The rotating element of a pump-motor unit, comprising motor armature, shaft and pump impeller, and weighing from 5,000 to 6,000 lb., is supported by one bearing of the "thrust" type, located on the top of the motor frame. This bearing is water-cooled. Steady bearings, as shown in one of the reproduced drawings, are provided for the 5-in. shaft at several levels.

With the present arrangement of motor-pump unit a pump can be put into action in less than one minute. This quick start is possible because all that is necessary is to throw in the motor switch. The pumps are always primed because they are located below low-water level and, as there is a check valve in each discharge pipe line, no manual operation of a valve is necessary.



Plan of Pump Pits and Intake

Oil for the thrust bearing is circulated by means of a small belt-driven rotary pump, hung below the motor frame.

The pumps, motors, transformers and electrical auxiliaries were furnished by the Allis-Chalmers Company. The electrical work and installation of the machinery are to be credited to the local force of the utility company.

Ingenious Sealing Well Utilizes Suction Head

The discharge from each pump is through 24-in. cast-iron pipe, the three pipes uniting in a 36-in. main. From this, branches lead to the several condensers.

The main discharge pipe from the condensers is also 36 in. in diameter. It leads down the hill to a sealing well of concrete, of 9 ft. inside diameter and 30 ft. inside depth. This return or draft pipe leads down centrally through the well, nearly to the bottom, from which the end is supported by T-irons "concreted in."

A conical spreader was cast in the well bottom to prevent formation of eddies. The sealing of the draft tube in this well eliminates about 20 ft. of head from the circulating water circuit.

From the sealing well a 54-in. interlocking-tile sewer overflow leads to the driver bank, discharging 1,100 ft. downstream from the pumphouse. The discharge is over a planked spillway in which a drop of more than 20 ft. occurs at low water. This gives a source of water power which may be utilized at some future time. Also the sealing well may at some time be tapped for water supply for the neighboring population, as this water is reasonably free from sediment due to the screening and the opportunity for settling.

This plan, reproduced on page 388, shows a 6-in. cast-iron pipe which carries the overflow from the old spray pond. It leads from a cistern located near the pond wall to a point on the river bank below the pump house. This pipe line is utilized in washing the intake screens of the pump house, as it furnishes a head of 80 ft., which is ample for the purpose.

The general development of this plant is due to the foresight and careful planning of General Manager H. J. Crowley and President Van Horn Ely. A word of credit is due the engineers who are responsible for the construction described, which was of more than ordinary engineering difficulty, due to the nature of the soil on the river bank and to the frequent inundation of this bank. The whole design was made under the direction of A. Kuylentsjerna, mechanical engineer American Railways Company, and the erection was done under the supervision of James Fagan, engineer of the company, located at Huntington. The steel work was furnished and erected by the Pitt Construction Company of Pittsburgh.

Bonded Intersections Recommended

Study by Bureau of Standards Results in Recommendation for Interconnection of Track Crossings of Detroit United Railways and Municipal System

IN A REPORT recently rendered by the Bureau of Standards to the Michigan Public Utilities Commission in the controversy of long standing between the Detroit United Railway and the Street Railway Department of the city of Detroit as to whether the track intersections of the two companies should be insulated or bonded the Bureau of Standards reaches the conclusion that best results would obtain if the two systems were electrically interconnected. In the course of the construction of the Detroit municipal system it became necessary to cross the tracks of the Detroit United Railway at numerous points, and the officials of the municipal system desired to make these crossings of the bonded rather than the insulated type. This form of crossing was objected to by the Detroit United Railway and subsequently, through the action of the State Legislature, the question was placed under the jurisdiction of the Public Utilities Commission. On June 1, 1921, the commission requested the Bureau of Standards to take charge and make an investigation, and report which type of crossing should be used. The bureau was requested to make such investigation as was deemed necessary and received full authority to do so. In co-operation with the two railway companies and an electrical engineer of the commission a study was made of the various factors affecting the problem, including the measurement of roadbed resistance, the magnitude of current drainage under various conditions, etc.

The arguments presented by the city in favor of interconnecting the two systems and in opposition to insulating the crossings were that (1) bonded crossings conform to standard practice; (2) the American Committee on Electrolysis and the Bureau of Standards recommend the bonding of different railway systems at points of intersection; (3) experience of insulating joints in Detroit under conditions practically identical with the present has proved unsatisfactory; (4) effective insulation cannot be maintained, and (5) insulating crossings will result in potential differences between tracks which may endanger the lives of animals, particularly horses.

The arguments presented by the Detroit United Railway in favor of insulated crossings and in opposition to bonded crossings are as follows:

1. Interconnection of the two systems would establish a condition whereby the Detroit United Railway would not be able to control the current originating on its system, and thereby involve it in liabilities for damage caused by stray current over which it would have no control.
2. The city, in employing a type of roadbed construction of lower electrical resistance to earth than the Detroit United Railway roadbeds, creates a low resistance leakage path through which the D. U. R. current will stray to earth and underground structures.
3. Voltage drops on the Detroit United Railway tracks are said to be reasonably low and the resistance of the roadbeds reasonably high, both conditions tending to prevent the escape of stray current from the tracks. This condition would be disturbed by the interconnection of the tracks of the Detroit United Railway and those of the city, by reducing the effective roadbed resistance of the former system. To offset this condition, the D. U. R. contends that it will have to install insulated negative feeders at a considerable expense in order to balance the potentials and prevent the escape of stray current.

Anticipating the report of the American Committee on Electrolysis, the Detroit United Railway contends that the tendency toward electrolysis mitigation is in the direction of the elimination of stray current, and that in asking for the interconnection of the track system the city is requiring something that will sooner or later impose additional expense on the Detroit United Railway in order to conform to prescribed requirements.

It is said that the Bureau of Standards' statements regarding the interconnection of tracks are in general valid, but that they do not contemplate interconnection under such conditions as prevail in Detroit. Furthermore, they apply only from a strictly technical standpoint, and without consideration of the fixing of liabilities or improving the conditions of one part at the expense of the other.

The report then presents a discussion of the fundamental principles involved in the interconnection of tracks and makes the observation that in an extensive and complicated system, such as will exist in Detroit with the completion of the city tracks, about 100 crossings will exist. Without this interconnection of tracks at these intersections each system will be more or less independent of the other and will be called upon to return the current originating on its own lines. This condition, aggravated by the intermittent character of street railway loads and the unbalanced loading on the several lines, will result in high potential differences between the two systems at many points. These potential differences will cause stray currents to concentrate near the points of intersection, and underground structures such as pipes and cable sheaths which are in the path of these stray currents will act as shunts to convey them. Even under the most favorable arrangement of loading and return feeders these potential differences could not entirely be eliminated and would undoubtedly be a constant source of danger to underground structures in the vicinity of the crossings.

If, however, all points of intersection are bonded the two systems will act as a common network and currents will readily flow from one system to the other to equalize the potential differences due to the unequal loading on the various tracks. Long lines, over which relatively high-voltage drops would otherwise exist, will be intersected by tracks of the other system and parallel paths will thereby be provided and the voltage drops reduced.

DISCUSSION OF THE CITY'S ARGUMENTS

The report then takes up a detailed discussion of each of the arguments presented by the city, but finds that none of them is particularly valid except the one stating that effective insulation cannot be maintained. In regard to this point the Bureau of Standards explains that with a large track mileage, a large number of crossings and the close paralleling of many lines of two systems it would be impossible to prevent interchange of current between the two track systems even though all intersections were insulated. In many cases a long length of track on one system will be shunted by parallel track of the other system, and if an attempt is made to insulate them from each other the entire voltage drop on such a section of track may be concentrated across the two insulating joints and result in excessive leakage at those points. A condition similar to this has been found to exist in the vicinity of the Hart Avenue substation where the city now has cars in operation on Charlevoix Street and St. Jean Avenue.

Insulating joints exist between the two tracks at St. Jean and Mack, which the city put in according to the wishes of the Detroit United Railway in order to effect a crossing. In order to take care of the current from the city cars while on this crossing the negative buses of the two systems are connected at the Hart Avenue substation. A current exchange of from 0 to 500 amp. takes place over this bus tie, the direction being from the city bus to the Detroit United Railway bus. The report states that as there are no metallic connections between the two track systems it is evident that this current interchange takes place through the earth between them, and in so doing may traverse pipes and cables with consequent injury to them.

Measurements were made on June 17 at this substation to determine the magnitude of the current drained from pipes under various conditions and also to note the variation in the current interchange between the two negative buses under corresponding conditions. These two quantities were measured over a period of one hour, during which time the crossing at St. Jean and Mack was connected by cables for a short time. Also for a period of four minutes the power supply for the cars on the city system was interrupted in order to determine what effect this would have on the current interchange between the buses and the magnitude of the drainage current from the water pipes. The record shows that no material change occurred in the drainage current from the water pipes for the various conditions imposed. It also shows that there is no material change in the current interchange between the buses whether the crossing at St. Jean and Mack is insulated or connected.

It is pointed out that these measurements indicate that a considerable leakage takes place between the two systems when no metallic connection exists between them, but that the quantitative evidence is relatively of little value because conditions as they now exist are only temporary and will be materially changed with the completion of the track and with the more extensive operation of city cars. However, they do indicate that effective insulation between the two systems cannot be maintained and that considerable leakage between them will take place through the earth.

DISCUSSION OF D. U. R. ARGUMENTS

Of the arguments presented by the Detroit United Railway the disparity in the roadbed resistance of the two companies is the only one considered by the bureau to be valid and the only one which might qualify the advantages of interconnection. From the measurements that were made to determine the relative roadbed resistances it was found that for the city tracks they ranged from 0.0313 to 0.0746 ohms per 1,000 ft. of double track, with locations selected to include all types of construction. Measurements made on four different locations on the Detroit United Railway tracks indicated resistances ranging from 0.0689 to 0.16 ohms per 1,000 ft. of double track. The locations selected included various types of construction, ranging in age from three years to ten years.

The report points out that the reason for the evidently higher average resistance of the D. U. R. roadbeds is a subject of more or less speculation. It states that the early contention of the D. U. R., that cinders employed in the sub-base of some of the early tracks built by the city and the use of steel ties contributed to a low roadbed resistance, is not substantiated by the tests. A short section of track which had been temporarily filled in with cinders was found to have a higher resistance to earth than any other section of the city track on which measurements were made, and the roadbed on Charlevoix Street in which wood ties were employed was one of the lowest resistance roadbeds tested.

It was found that the roadbed resistance of the D. U. R. tracks increased with age, which fact is also supported by tests made by the Bureau of Standards on experimental roadbeds over a period of three years, although the change was small. It is pointed out that while the age of the roadbed may be one factor contributing to the difference in resistances between the two systems, it is believed that the type of construction is a more important factor. In all of the city lines a concrete pavement is employed which makes intimate contact with the web and head of the rail as well as with the base. The D. U. R. employs a type of construction in which the concrete is brought up around the base, but is not in contact with the web and head of the rail, brick or stone blocks laid with dry mixture of cement and sand being laid adjacent to the rail.

A careful inspection of the D. U. R. track and the testimony of the engineers indicates that after a period of years with the continual pounding of car wheels over the tracks, together with the action of frost, the pavement becomes loose and porous about the rails and intimate contact with the concrete is frequently lost. This seems to account for the difference in resistance between the new and old lines of the D. U. R. and also between these and the city lines. The report then states that if the city construction can withstand the disintegrating influences of traffic and frost and the rails maintain an intimate bond with the concrete, the roadbeds will probably not undergo a change in resistance with time as the D. U. R. roadbeds appear to have done.

All of the resistance measurements of the roadbed were made under dry weather conditions and after a period of a number of days without rain. Judging from many measurements made by the bureau on numerous tracks under different weather conditions and over a period of years, it seems altogether probable that when wet the D. U. R. tracks with the porous pavement would have lower resistance, while moisture would have very little effect on the new city tracks with tight pavement.

Concluding the discussion on this subject, the report points out the desirability of considering the problem under ultimate conditions, when the city system will comprise a number of the day-to-day lines of the Detroit United Railway, rather than under the present temporary conditions. With this in mind, the bureau finds that while it is probable that for years to come the average resistance of the city roadbeds will be somewhat lower than the D. U. R. lines, this disparity and the injury to underground structures which might result from it appear to be more than offset by the greater advantages which will result from the interconnection of the two systems.

RETURN CIRCUIT SYSTEM

The contention of the Detroit Railway that the bonded crossings would change the disposition of the leakage currents, and require the installation of an insulated negative feeder system to correct this, does not appear to be well founded, the report continues. While the two systems will probably have common points of power supply in some cases, and while the greatest benefit to be derived from the interconnection of track does not obtain with coincident points of power supply, it is nevertheless not apparent that the D. U. R. will have to install insulated negative feeders to match any system of this kind which may be installed by the city for the return of the current. The condition of noncoincident points of power supply will be approached if the insulated negative feeders of the city system connect to the track network at points remote from the common source of power supply. Current originating on the network near the substation from either railway system will be returned over the D. U. R. feeders which presumably connect to the track close to the supply station, while current originating on the two networks at more remote points can be returned over the insulated negative feeders installed by the city. Each system of feeders, however, will return the amount of current used by its own cars, provided the negative buses of the two systems are not interconnected, and this will be quite independent of the voltage drops which may exist on the various feeders. If the power supply points do not coincide, then still further advantage may result from interconnection of track, for the voltage drops in the two track systems will be neutralized and the potential differences greatly reduced.

The bureau reaches the conclusion that the interconnection of different track systems at all points of intersection undoubtedly conforms to the best modern practice, and the benefits to be derived from such interconnection are so apparent and the arguments are so valid that to depart from this procedure would be considered only where local conditions are of such a peculiar character as to vitiate the well-known principles involved in interconnection. Except for the difference in roadbed resistances of the two systems, the conditions in Detroit are in no way different from those usually existing where two track systems intersect, and in fact the large number of crossings involved in Detroit offer unusual opportunity to utilize the advantages of interconnection. Since the advantages to be derived from interconnection far outweigh the possible disadvantages resulting from a difference in the roadbed resistances of the two systems, the bonding of all crossings is strongly recommended.

Instructions for Police on Railway Duty

FOR the guidance of the police while on duty on the property of the Beaver Valley Traction Company, W. H. Boyce, general manager, has issued to them a copy of a pamphlet called "Instructions for Police." On account of the class of workers in the vicinity of New Brighton, Pa., with whom the conductors formerly had a great deal of trouble, the railway company found it necessary during the past fifteen years to employ one or more police at all times. The chief of police acts as inspector also, being on duty from 4 p.m. to 1 a.m. In addition to this man, who is the only regular policeman, there are other employees of the organization, such as dispatchers and inspectors, who are sworn in as special policemen with a view of keeping down disturbances on the cars and about the property. These men are so empowered by law that there is no question about their being legally authorized to handle such cases as may arise.

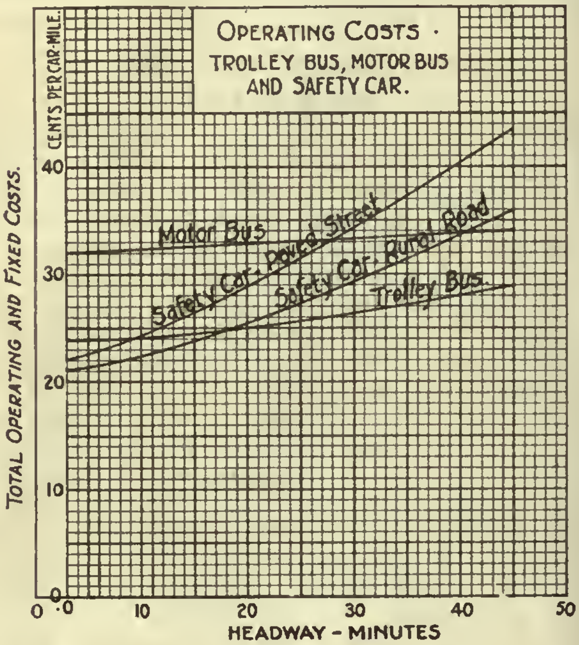
In order to insure harmony of working conditions a few general regulations were thought to be necessary, and with that purpose in view a set of instructions were prepared to increase the co-operation among the various departments. There is reprinted in the pamphlet the act relative to the appointment of police for street passenger railways incorporated under the laws of Pennsylvania. This says that a street railway may apply to the Mayor of the city in which the railway is operated to commission persons to act as private policemen for the railway company. All the general rules and duties of the officers are outlined so that they may know just how far their jurisdiction extends and just what to do in any circumstances. The pamphlet also includes the laws on arrests and warrants, the law on resisting an officer, the law on breach of peace, and an act which deals particularly with preventing fraud against common carriers. With such a guide in their work, it was believed that the police would be better able to perform their duties with dispatch and the least inconvenience to all.

At one time a certain element in that community had an idea that it could, and at times it did, run things to suit itself on some of the cars and in some of the parks of the company. That condition has been done away with, however, but in starting to break up the practice it was necessary at first to have as many as seventeen policemen on duty on days of large traffic. But now it is known that the policy of the company is, "If we don't get them today, we will get them tomorrow, next week, next month, or even next year if it is possible to locate them." Consequently arrests have decreased each year and have been reduced from more than 400 several years ago to thirty-five last year.

The Field of the Trolley Bus

Statistical Analysis Indicates Cost of Trolley Bus Operation Is Less than the Motor Bus or Safety Car on More Than Eighteen-Minute Headway

SOME comparative figures on cost of motor bus, trolley bus and trolley operation have recently been compiled by Karl F. Simmon of the railway department of the Westinghouse Electric & Manufacturing Company. In any consideration of the economical field of the trolley bus, according to Mr. Simmon, there are many elements that enter and some of the more important are the following: (1) Existing transportation available, (2) are rural or paved roads involved, (3) density of passenger traffic, (4) condition of existing roads, (5) yearly tax burdens for buses, (6) labor and material costs, and (7) power equipment available.



The taxicab or "service at call" vehicles, the gas bus, trolley bus, safety car or double-truck car, all have an economical field, and in order to determine roughly what these are for gas bus, trolley bus and safety car some comparative figures have been compiled. In this comparison it is assumed that the motor bus and trolley bus have the same seating capacity, namely, thirty, and that the safety car—which is of the single-end type—seats thirty-five. The comparison is then shown in the accompanying table and curves.

While many assumptions are involved in this calculation and diagram the tendencies are self-evident. An analysis of the curves seems to indicate:

1. That the cost of the gas-driven motor bus does not decrease materially as density of service increases.
2. That if the safety car tracks are laid on a rural or improved road, the safety car ceases to be more economical than the motor bus when the headway is materially increased beyond forty minutes.
3. That the trolley bus or safety car service is fundamentally more economical than the motor bus service for frequent service due to the cost of gasoline and maintenance of gas engine equipment.
4. That railless vehicles show up to advantage, due to practically free use of roads, whereas rail vehicles must maintain both rails and a portion of the street paving surface.
5. That safety car transportation excluding paving expense is more economical for service where the headway is less than seventeen minutes. If paving burdens are imposed on the vehicle running on rails its economical field may be materially reduced.

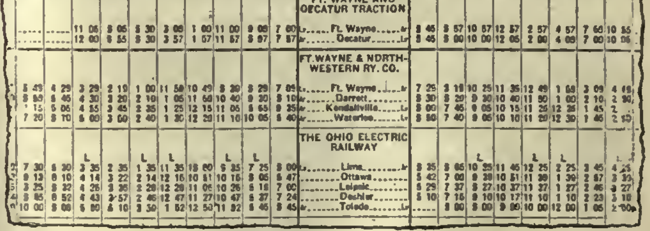
Only actual trolley bus service will tell the real story as there are many unknowns that cannot be evaluated at present.

ASSUMPTIONS MADE IN CALCULATIONS AND RELATIVE COSTS

	Motor Bus	Trolley Bus	Single-End Safety Car
Seating capacity	30	30	35
Schedule speed	10	10	10
First cost	$7,000	$8,000	$6,250
Cost of paved city single track, per mile	.....	.....	$50,000
Cost of paved city double track, per mile	.....	.....	$90,000
Cost of rural improved single track, per mile	.....	.....	$30,000
Cost of rural improved double track, per mile	....	.....	$54,000
Cost of 200 ft. siding	.....	....	$3,500
Cost of No. 0000 trolley construction, per mile	.....	$5,000	$3,700
Cost of No. 0000 feeder, per mile	....	$610	$610
Cost of operation (cents per car-mile):			
Conducting transportation	7.3	7.3	7.3
Cost of power	.....	2.5	2.5
Gasoline and oil	6.0	.....	......
General and miscellaneous expenses	4.0	4.0	4.0
Maintenance track and roadway	.....	.....	1.9
Roadway tax	1.0	1.0	......
Other way and structure expense	.....	1.05	0.60
Maintenance of car and vehicle	10.6	5.0	1.50
Depreciation; life in years	5	8	12

Something New in Interurban Time-Tables

THE Fort Wayne, Van Wert & Lima Traction Company, of which S. W. Greenland is general manager for the receiver, has issued a new form of time-table for the convenience of travelers who may desire to know what connections with other electric lines may be made at either end of the line named. This new time-table folder presents in a compact form the main-stop schedules of all other electric lines running out of either Fort Wayne or Lima, the two terminal cities of the Van Wert line. The table occupies one side of the folder, while on the other side is presented the local time-table of the Van Wert line and various other general information about excess cash fares, class of trains, how to stop a car at night, baggage service, mileage books, interline tickets, children's fares, requirements for special cars, etc.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READ DOWN
CONNECTIONS
READ UP
Central Time Except East of Findlay
Central Time Except East
INDIANA SERVICE CORPORATION
Ft. Wayne
Huntington
Wabash
Peru
Indianapolis
Logansport
Lafayette
Ft. Wayne
Bluffton
Muncie
Anderson
Indianapolis
FT. WAYNE AND DECATUR TRACTION
Ft. Wayne
Decatur
FT. WAYNE & NORTHWESTERN RY. CO.
Ft. Wayne
Garrett
Kendallville
Waterloo
THE OHIO ELECTRIC RAILWAY
Lima
Ottawa
Leipsic
Deshler
Toledo

CENTRAL PORTION OF TIME-TABLE SHOWING CONNECTIONS WITH OTHER ELECTRIC LINES

This folder eliminates the difficulty experienced by many people desiring to patronize electric lines in determining the connections that can be made.

Tendency in Train Operation

An Appreciable Rise in Motor Temperature Follows the Attachment of a Trailer to a Motor Car—Operating Expenses Should Be Less with Multiple-Unit Trains Than with Motor Car and Trailer and the Investment Is Often Less When Necessary Track Changes Are Considered

BY G. M. WOODS
General Engineering Department, Westinghouse Electric & Manufacturing Company

MOTOR AND TRAILER OPERATION IN BROOKLYN

THE TENDENCY in street railway practice is toward train operation for heavy traffic. Several operators who heretofore have consistently favored single-car operation now feel that the time has come when train operation is the only solution to their traffic problems. Undoubtedly a reduction in the number of units reduces the congestion, and a two-car train will cross a street intersection just as quickly as a single unit. The question of the relative merits of multiple-unit trains and motor car and trailer trains is of primary importance.

The relative advantages of the two systems have been discussed at various times, but at present the problem in some respects must be considered in a new light. The street railways have just passed through a period of "starvation." Their equipment and property as a whole have deteriorated in many instances and must be revamped similar to many steam roads. This period has also had favorable aspects, for it has resulted in a better understanding on the part of the public, increased fares, and a thorough appreciation of the commercial side of the street railway business. The rehabilitation of the railways will take place under new conditions and the relative values of the factors entering into the choice of equipment will be changed. The public will be given more thought in the purchase of new equipment, and cars of good riding qualities and pleasing appearance will be bought. The cars must also be of such type that adequate service can be furnished at minimum operating expense during all hours of the day. The public, in return for the increased fare it is paying, expects new equipment and better service. At the same time the standards of economy which have been set up must be maintained.

In the past the purchase of new equipment for train operation has been greatly influenced by the fact that in many cases cars with motors large enough to haul trailers a few hours per day were already owned. The motors were of the non-ventilated type, and while temperatures were frequently higher than desirable, the large copper section of the conductors and the high thermal capacity permitted of overloads for short periods without excessive motor maintenance. The motors of this class now available on most properties will soon be obsolete and will be replaced by ventilated motors with suitable capacity for the all-day service, but not with sufficient capacity to haul a trailer during the most severe traffic conditions of the day. It is obviously incorrect to purchase new trail cars to be hauled by electrical equipment which has only a few more years of useful life and which can be replaced only at excessive first cost.

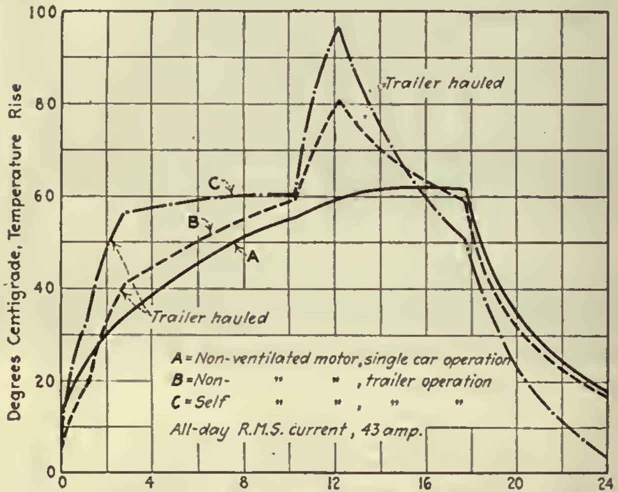
COMPARISON OF MOTOR TEMPERATURES

The graphs of temperature rise show at *A* the temperature rise of an inclosed motor used in single-car operation. At the start of the day's run the motor temperature was slightly above air temperature on account of its not having cooled completely after the service of the preceding day. The temperature gradually increased until the rise reached 62 deg. C. and remained fairly constant until the car was taken out of service.

Graph *B* shows the temperature rise of the same motor when the car hauled a trailer on another route for one trip of one and one-half hours in the morning and for one and three-quarter hours in the evening.

The only effect of the morning trailer hauling was to cause the motor temperature to rise more rapidly than if the previous load had been continued, but if the trailer had been hauled for two trips, or three hours, the temperature rise would have nearly reached 60 deg. C. When the trailer was added in the afternoon the temperature rise increased to 80 deg. C. Attention is called to the fact that the trailer hauling resulted in a temperature rise 18 deg. C. higher than the operation without trailer, although the all-day service in both cases gave the same root mean square current value. When the trailer was detached the service became much easier and the temperature of the motor decreased rapidly. On the test without trailer operation the service remained at nearly the same severity until the last trip, which was the most severe of the day.

It is obvious that the addition of a trailer greatly increases the loads imposed on a motor in any given service. In the example chosen a route on which single cars were normally operated and another route on which trailers were operated, both having the same all-day route mean square current, were taken so as to illustrate the higher temperatures reached when trailers are hauled. It is believed that the full effect of these short-time overloads is not usually appreciated.



TEMPERATURE CURVE OF VENTILATED AND NON-VENTILATED MOTORS WITH AND WITHOUT TRAILER

Graph *C* shows the performance, with trailer operation, of a ventilated motor of such capacity that if operated in the service without trailer, the maximum temperature rise would be the same as that of the non-ventilated motor. The increase of temperature was more rapid at the beginning of the day than for the non-ventilated motor. When the trailer was added the rate of increase was very nearly the same as that for the non-ventilated motor because the temperature was nearly 15 deg. C. higher and therefore more heat was radiated and the load imposed was not much in excess of the motor's continuous rating. At the end of the trailer operation the ventilated motor was still approximately 15 deg. C. hotter than the non-ventilated motor. After the trailer was detached the temperature of the motor increased slowly until a constant temperature, practically the same as that of the non-ventilated motor, was reached. At the end of the one and three-quarter hours' trailer hauling in the afternoon, the temperature rise was 96 deg. C., which is 34 deg. higher than the temperature rise would have been in the service without trailer, although the average all-day service was of the same severity.

SHORT-TIME LOADS ARE IMPORTANT FACTORS

Short-time overloads, such as those caused by running on a grade with cars standing full of passengers, produce temperature rises considerably in excess of those shown on the curve. Hence, it is evident that short-time loads are very important factors in the application of the ventilated motor. Because of the more rapid rise of temperature the addition of a trailer requires a greater increase in motor capacity with the ventilated than with the non-ventilated motor.

After the trailer is detached, the temperature of the ventilated motor decreases rapidly because of the smaller mass of metal and the action of the ventilating fan. The ventilated motor has such marked advantages in weight and cost that its continued use is assured. It is well to keep in mind that trailer operation not only imposes an additional load on the motor when the stops are most frequent and operating conditions most severe, but also, by the reduction in speed it decreases the amount of air which passes through the motor with a resulting decrease in service capacity for this operation.

A study of the equipment required to provide service on an important city line recently disclosed the interesting facts that not only were the operating expenses less for multiple-unit cars than for motor cars and trailers, but the initial investment was also less. The chief savings were in power, labor and maintenance. The power saving is due to the use of a lighter car with equipment exactly suited to the service to be performed. When a motor car is to haul a trailer a few hours per day, it is unnecessarily heavy and the motors are of uneconomically high capacity and speed for single-car operation.

When a trailer is coupled to a motor car, even where there are no grades, the rate of acceleration is reduced, due to only part of the weight of the train being on the axles in which motors are mounted. This reduced rate of acceleration takes place at the time when speed and quick "get away" are most important in order to keep moving under congested traffic conditions. The reduction in schedule speed requires more cars to maintain the necessary headway and hence increases the cost of platform labor. On some railway properties where trailers are hauled, the nominal running time is kept the same as for single-car, non-rush operation and a considerable increase in layover time is allowed. This scheme has certain marked advantages, but it should not be permitted to obscure the fact that the car-hours are actually increased.

The maintenance of cars exclusive of electrical equipment should be slightly less for multiple-unit than for trailer operation, because the shocks are less severe. In the particular railway service mentioned, the motor car mileage was 27 per cent greater for the multiple-unit cars, but the motor weight was approximately one-half that for the cars intended for hauling trailers. The maintenance of motors per car-mile for the multiple-unit cars should, therefore, be from 65 to 75 per cent of that for the other cars. The result is that the maintenance of the multiple-unit electrical equipments was approximately 90 per cent of the electrical equipments for trailer hauling.

Boston Car Equipped for Three-Car, Multiple-Unit Train Operation

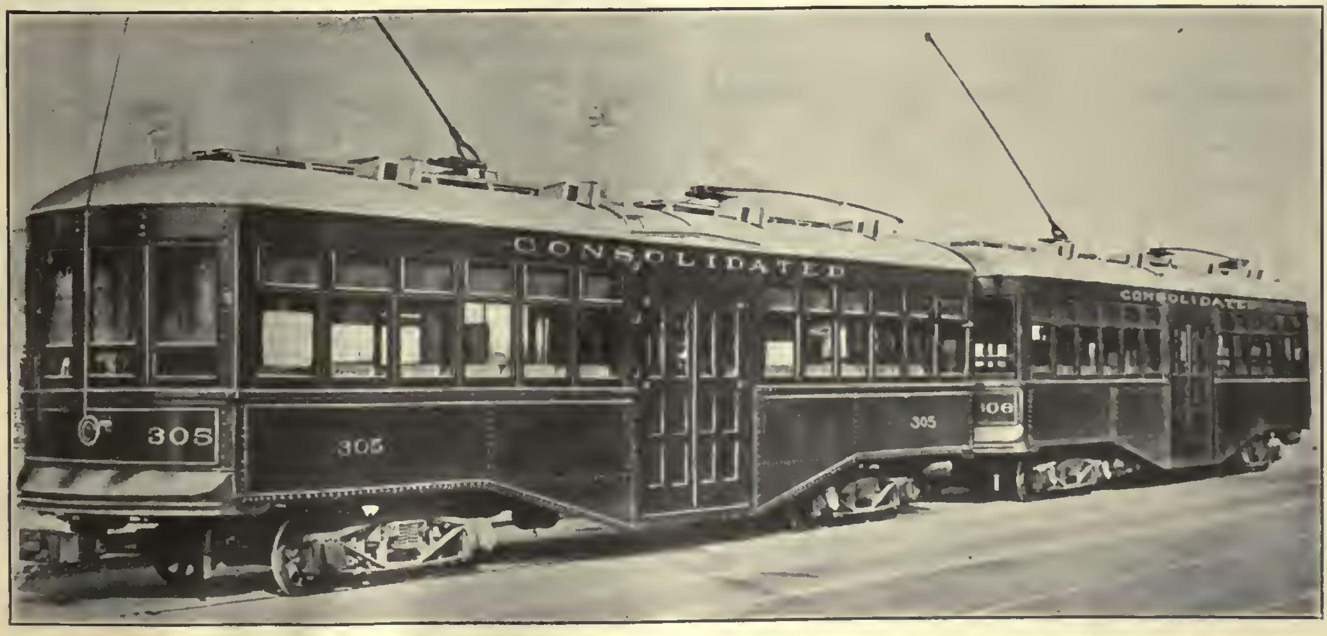
Multiple-Unit Train of the Milwaukee Electric Railway & Light Company

When trouble occurs on a motor car hauling a trailer, both cars are tied up, whereas if trouble occurs on one car of a two-car train, only one is affected. When multiple-unit operation is employed, the individual units can be used interchangeably, and thus there are a number of cars in the barn during non-rush hours. The percentage of multiple-unit motor cars available for minor repairs and inspection is, therefore, greater than the percentage of motor cars available where trailers are hauled. The result is that a less percentage of spares need be provided for multiple-unit operation than for trailer operation, and while the cost of a single motor car and trailer may be less than that of two motor cars suitable for multiple-unit operation, the total investment is frequently greater. Some form of switching equipment is usually required for handling trailers, and even where an old passenger or work car is used its value is properly chargeable to the investment for rolling stock. The switching of trailers also increases the crew expense.

In recent years the general use of low-floor cars with 24-in. and 26-in. wheels makes it difficult to provide sufficient motor capacity to haul trailers under severe traffic conditions and at the same time to have satisfactory gears and clearances under the motor and gear case. Control equipment more suitable for multiple-unit operation and for mounting under low-floor cars or in cabinets in the cars is available for all modern cars.

There are a number of lines on which trailers cannot be used satisfactorily, due to severe grades or snow conditions during the winter months. Most passengers have the feeling that trailers are unsafe and this feeling is enhanced by the occasional running away of trailers on grades. Even on level lines there is more jerking in stopping and starting a trailer than on a motor car and passengers generally prefer the motor car.

In the past there have been a number of electric railway lines on which it was generally agreed that multiple-unit operation was superior in many ways to trailer operation. There has been the impression in some quarters that, where physically possible, trailer operation is more economical than multiple-unit operation and that multiple-unit operation has only a certain inherent flexibility which cannot be obtained with trailers. If the comparison is made on a correct basis at the present time, the cost of multiple-unit operation rarely will be found to exceed that of trailer operation. Railway operators planning the purchase of new equipment for train operation will do well to investigate thoroughly the relative advantages of trailers and multiple-unit trains under their particular conditions before deciding on the type of equipment.



Two-Car Train, Charleston Consolidated Railway. Cars Equipped with HL Control for Multiple-Unit Operation in Navy Yard Service

Perpetual Inventory as a Part of Accountants' Records

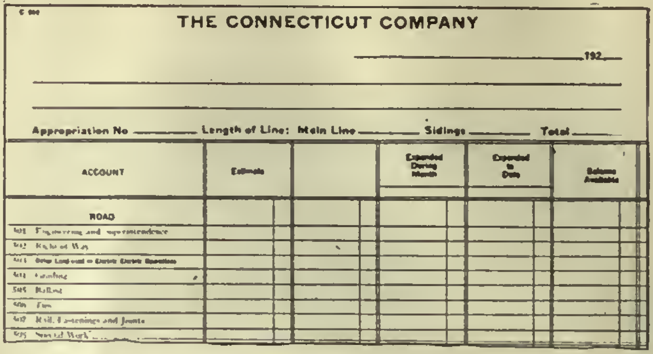
Method of Compiling and Maintaining Inventory—Typical Record Forms—Arguments For and Against Other Methods—Co-operative Solutions by Engineering and Accounting Departments

By I. A. May, C.P.A.
Comptroller the Connecticut Company

THE perpetual inventory has been discussed at length by accountants and engineers during the past few years and all agree as to its value in the railway industry. But as to the method to be used in compiling and maintaining the inventory there is no such universal agreement. This is the question that is disturbing and results in bringing out different ideas.

Actually, perpetual inventory is nothing more than a detailed history of the construction of the several parts of the plant. It seems to be a dream to certain engineers, but it is merely an extension of the construction records already found in the accounting department of every street railway company.

If the accounting department is unable to answer such questions as, "What did a certain power house, transmission line or distribution system cost? What is the value of this portion of track or the investment in that type of car?" then the accounting department system is not complete or has not been expanded sufficiently. With a proper system the accounting department should be able to give all such information down to the details of the cost of each unit in a power house from foundation to smokestack.



C 690

THE CONNECTICUT COMPANY

________________192___

Appropriation No ______ Length of Line: Main Line ______ Sidings ______ Total ______

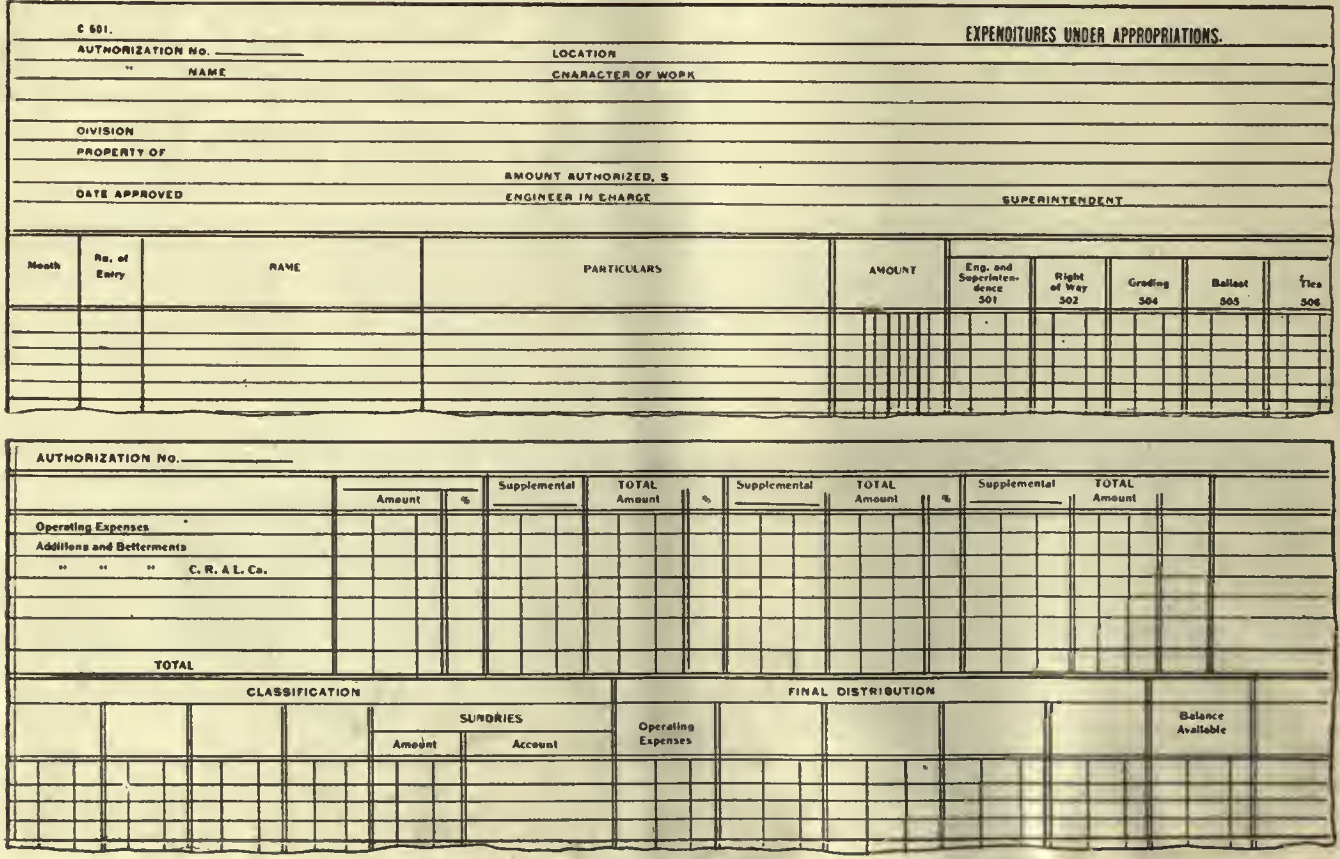
ACCOUNT	Estimate		Expended During Month	Expended to Date	Balance Available
ROAD					
501 Engineering and superintendence					
502 Right of Way					
503 Other Land used in Electric Railway Operation					
504 Grading					
505 Ballast					
506 Ties					
507 Rail, Fastenings and Joints					
508 Special Work					

FORM TO BE FILLED OUT UPON COMPLETION OF WORK

Adequate cost and construction records are essential to the intelligent operation of any railway system. Not only are they useful and necessary in the company's operation but, if well kept, they may, as was pointed out editorially in the ELECTRIC RAILWAY JOURNAL, June 11, 1921, page 1067, be the means of a decided money saving in the event of civil, regulatory or appraisal cases.

The "Authorization" or the "Authority for Expenditures" systems, if complete, in any accounting department show the actual expenditures on construction work or additions. The accompanying Form C 601, as used by the Connecticut Company, is typical. Also, when any work has been completed a properly designed form can be filled out and forwarded to the engineer under whose direction the work was done. A typical form of this type is shown as Form C 690.

The engineer in charge can then show the correct distribution of costs in the blank columns and return the form to the comptroller's office for final adjustment, and the form when complete reflects the exact cost of the job and can be filed for reference. Unit costs computed from such forms, with due allowance for market and local conditions, afford valuable data for making



C 601.

EXPENDITURES UNDER APPROPRIATIONS.

AUTHORIZATION NO. ______ LOCATION

" NAME CHARACTER OF WORK

DIVISION

PROPERTY OF

AMOUNT AUTHORIZED, $

DATE APPROVED ENGINEER IN CHARGE SUPERINTENDENT

Month	No. of Entry	NAME	PARTICULARS	AMOUNT	Eng. and Superintendence 501	Right of Way 502	Grading 504	Ballast 505	Ties 506

AUTHORIZATION NO. ______

	Amount	%	Supplemental	TOTAL Amount	%	Supplemental	TOTAL Amount	%	Supplemental	TOTAL Amount	
Operating Expenses											
Additions and Betterments											
" " " C. R. & L. Co.											
TOTAL											

CLASSIFICATION						FINAL DISTRIBUTION						
				SUNDRIES		Operating Expenses					Balance Available	
				Amount	Account							

TYPICAL FORM USED TO AUTHORIZE EXPENDITURES. LOWER PORTION SHOWS THE REVERSE OF THE RIGHT HALF OF THE UPPER PORTION estimates on contemplated projects of a similar character.

From such construction forms the material for the perpetual inventory is readily obtained by any of several methods. An extra clerk could be employed to write up what might be called the construction ledger. Another way would be to keep it on a card index basis.

A proper co-operation between the engineering and accounting departments would then obtain a perpetual inventory by a relatively simple extension to existing practice in each of the departments. The engineering office should be in possession of all maps, blueprints, mileage charts, detailed unit costs of construction and the accounting office should be in possession of all ledger figures, construction records and cost books.

In an article by E. A. W. in the ELECTRIC RAILWAY JOURNAL for May 14, 1921, page 893, it is suggested that the engineering office prepare all detailed estimates (without costs) and then forward them to the accounting office to be checked and compared with similar work and that the accounting office then should make up the cost data on the estimates from data in its files. The writer does not agree to this procedure, but thinks that the engineering office should compile the complete estimates and then submit them to the accounting office for checking and suggestions, after which they should be placed in final shape by the engineering office and referred to the executive officers of the company for approval.

A PERPETUAL INVENTORY CAN BE OBTAINED FROM EXISTING DEPARTMENTS

To return to the perpetual inventory, some have suggested that a separate department be created to handle the work. The writer does not agree with such a suggestion for several reasons:

1. Since there are a certain number of fundamental departments inherent in any railway organization and as the engineering and accounting departments are in this category, no special departments should be established whose functions conflict with or overlap those of properly functioning fundamental departments.
2. A separate inventory department would be compelled to call upon the engineering and accounting departments continually for data. It would be compelled to check its figures with the ledger accounts of the accounting department. These conditions would result in duplication, lost motion and inefficiency.
3. The accounting department has the necessary office equipment and clerical staff already in operation and any duplication of investment in such items would not be warranted, particularly as such a department would need to operate only a portion of the time.
4. If the accounting department is functioning properly any question of cost regarding any portion of the plant can be answered.
5. The men in such a department would not be in close touch with actual construction or cost conditions. The engineer and accountant, inherently, are in positions where intimate relations with the job are maintained.

The perpetual inventory can be easily obtained by properly co-ordinating existing departments in a railway organization and, in view of its usefulness, should be a feature of all railway accounting systems. The costs involved in its maintenance are of little magnitude compared to the present and potential economies made possible by having it available.

Signal System for Expediting the Starting of Trains

TO EXPEDITE the starting of trains a new system of communication has just been placed in operation at the Long Island Railroad's Flatbush Avenue Station in Brooklyn.

By the installation of an electrically controlled mechanism provision has been made for prompt communication between the gatemen on both upper and lower levels and train conductors. This is accomplished by means of boxes located on each platform, called "conductor's stations," which are equipped with "communicating buttons" and colored signal lights, connecting with similar apparatus found at train gates and in the signal tower.

The new system operates as follows: Ten minutes before a train is scheduled to leave, or as soon as it is ready for occupancy, the conductor goes to the "conductor's station" nearest the head end of the train, opens the locked box, then presses buttons which flash a white light at the gates on the upper and lower levels of the terminal, thereby notifying gatemen that the train is ready to receive passengers and indicating that the gates may be opened.

One minute before leaving time the gatemen at the upper and lower levels press a button on the gatepost which illuminates red lights at the "conductor's station." The conductor then pulls out the buttons under these red lights, which indicates to the gatemen that their signals had been received, and immediately thereafter the conductor pushes in a button that indicates to the towerman at "F. T." tower (which tower controls all train movements in and out of the Flatbush Avenue Terminal) that the train is ready to proceed. The towerman acknowledges this information by pushing a button which illuminates a green light at the "conductor's station," whereupon the conductor pulls out the button under the green light, closes and locks the "station" and, after ascertaining that all passengers are loaded, gives the motorman the signal to proceed.

In order to take care of the passengers using the gate on the subway level, as well as those using the entrances on the upper and lower levels, three "communicating buttons" have been installed on the south side of Platform No. 1. This "conductor's station" is operated in the same manner as the "stations" on other platforms, with the exception that communication is effected with three gatemen instead of two.

The railroad management expects that this new system will greatly facilitate the handling of passenger trains at the Flatbush Avenue Terminal.

Lighting London Subway Connections

AN INTERESTING development in the lighting of subways is to be seen at the Charing Cross underground station in London, where the great increase in traffic during the last few years has necessitated the addition of several new passages, connecting the underground and the various tube railways. The lighting is effected by small lamps placed in recesses in the side walls.

The border of the recesses carrying the lamps is extended somewhat so as completely to screen the filament from the view of the passengers. The light is well diffused by the surrounding white walls of the passage and the method of screening the filaments seems to have a distinct advantage for this class of work.

Baltimore's New Type Safety Cars

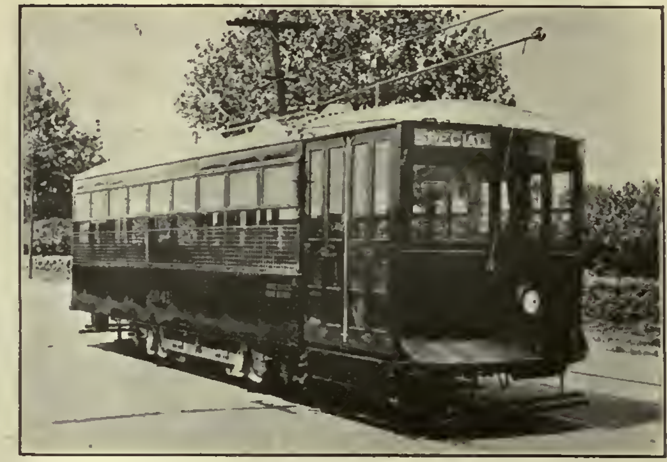
Wider Door Opening, Special Seating Arrangement and Wider Aisle Than Standard Safety Cars Are Some Features That Give Very Satisfactory Results

By L. H. PALMER
Assistant to President, United Railways & Electric Company, Baltimore, Md.

BRIEF mention was made in the ELECTRIC RAILWAY JOURNAL for May 7, 1921, page 881, of the purchase of ten one-man cars by the United Railways & Electric Company of Baltimore, and the issue for July 31, 1920, described the initial operation of thirty-three so-called standard one-man cars on one of the company's heavy transfer lines. These latter cars have been in service since July 1, 1920. After these cars had been in operation a short time it was found that, due to the heavy riding and particularly to the heavy interchange of passengers (because this line intersects most of the main trunk lines of the system and acts as a belt line), the movement of the cars was delayed because of the single narrow door which permitted only one passenger to alight from or board the car at a time. One of the principal criticisms of the public in connection with the use of these cars was caused by this feature. The fact that passengers tended to congregate around the front door aggravated the situation. This latter was due to the fact that in many cases the passengers were riding only a few blocks, owing to the character of the route traffic.

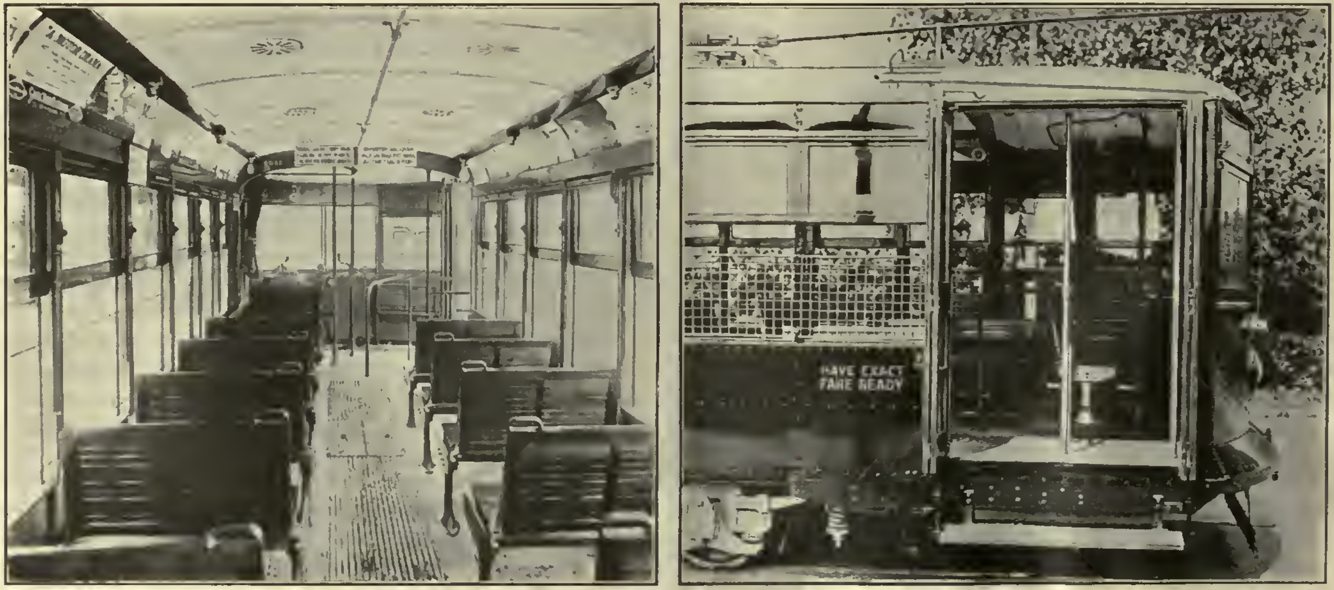
As a result of these conditions and the continued study of the problem by the company's engineers when it was decided to purchase additional equipment for another line, in the early part of 1921, it was determined that we would go to a car having a wider door opening which would permit of separate exit and entrance. Specifications were accordingly drawn up with this idea in view, and the new car embodied these improved passenger interchange facilities. By reference to the floor plan and photographs shown in accompanying illustrations a clearer understanding of the changes in the design of this car from the so-called standard will be obtained.

In addition to the wider door opening, a change in the arrangement of seats at each end of the car to give more standing room was worked out. In order that the transverse seats might be kept opposite each other, and in order to obtain the maximum seating capacity, the longitudinal seats at the ends of the car body are not of the same length, but so far it is found that the somewhat shorter well at the No. 2 end of the car works out almost as satisfactorily as the longer one at the No. 1 end. The car is 4 in. wider than the standard car and this additional width has gone into the aisle, which is another feature that has greatly facilitated the better movement of passengers and contributed to their comfort. The present car is 30 ft. 1 in. long, that is 24½-in. longer over bumpers than the older design, and seats thirty-three passengers as compared with thirty-two on the other car.

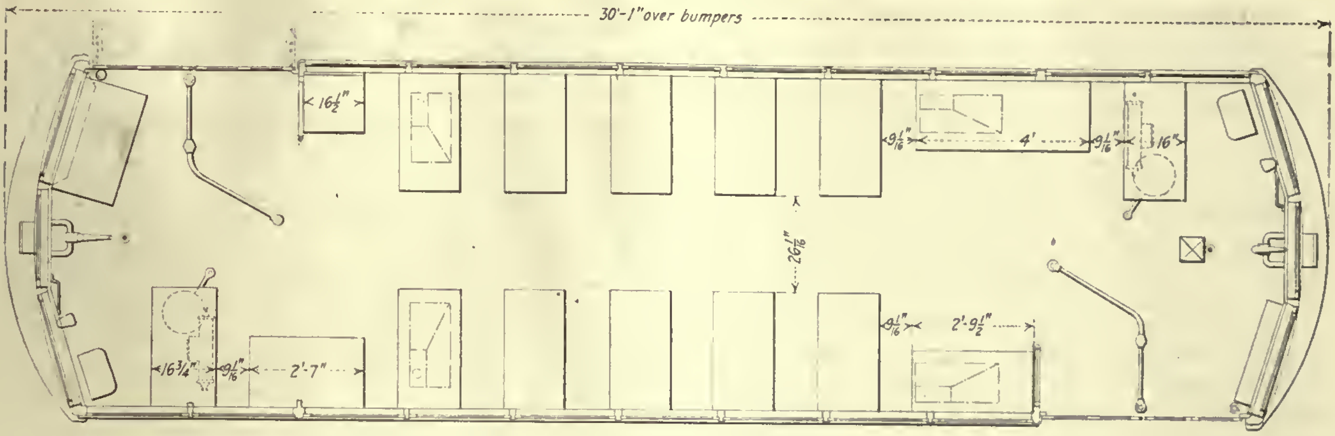


DOUBLE-ENTRANCE SAFETY CAR IN SERVICE

Appreciating the desirability of maintaining the principle of standardization as much as possible, in practically all respects except those relating to facilities for passenger interchange, the design of the standard safety car has been retained, but the improvements referred to and which are clearly indicated on the floor plan and photographs shown herein have materially increased the efficiency and effectiveness of this type of car, and the results of practically a month's operation have entirely satisfied the company that the present design is an improvement over the old one, and that the arguments which have been advanced in connection with recent discussion and correspondence



AT LEFT, THE WIDE AISLE GIVES FREE MOVEMENT OF PASSENGERS. AT RIGHT, DOOR AND STEP ARRANGEMENT



FLOOR PLAN OF BALTIMORE ONE-MAN CAR

in the technical press on this subject are entirely justified. With the changes outlined, moreover, the increase in weight of the car, as shown on our own scales, is but 450 lb. the new car weighing 17,350 lb. as compared with 16,900 lb. for the older type.

The cars are equipped with Westinghouse DH-16 compressors and S-12 governors, and two Westinghouse 508 motors with K-63 double-end control. Peacock style G hand brakes were used. The brakes on the old cars were not efficient and had to be redesigned, and the experience gained in this regard was used in installing an adequate hand brake on the new cars, with rod connections from the brake staff to the brake beams, instead of cables. The Brill standard safety car trucks 79—E1 with friction bearing were used.

These cars were put in operation on the Fremont Avenue line the first of August, displacing ten of the older type, and are operating in daily service with the remainder of the older cars. Results to date have been exceedingly satisfactory, and have fully justified the decision to redesign and improve the so-called standard car, for service in Baltimore.

During periods of light riding, there is little difference between the operation of the two types of front-entrance one-man cars, but when riding is heavy, particularly during the morning and evening rush periods, the superiority of the newer type with wider door opening over narrow-door design is very evident.

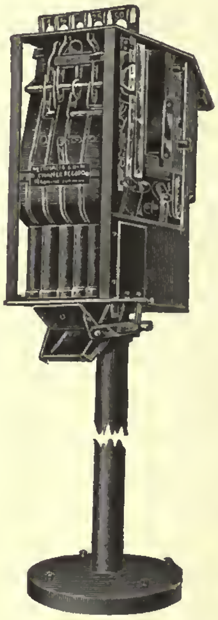
A recent series of observations made with a stop watch, between the two types of cars during the rush hours, at points where heavy loading both on and off the car took place, shows that the new type of car has reduced the average seconds per stop 20 per cent, namely, from twenty-two seconds to seventeen and one-half seconds, and the average seconds stop per passenger 17 per cent from 1.8 second to one and one-half seconds per passenger. We anticipate that still more favorable results will ensue as the public becomes more familiar with the new equipment. There is naturally some lack of most efficient use because more than half of the cars in service are of the older type, and there is some hesitation and confusion on the part of passengers in availing themselves simultaneously of the entrance and exit facilities. This is gradually improving and we feel that were the whole line equipped with the new design, a still better showing would be made. The figures given are for an average of twenty-one stops for each type of car, taken at the same points and during the same rush periods.

No difficulties have arisen in the collection of fares, and our observations indicate that this is controlled as well as on the older type. When the doors are opened, the operator asks passengers to board by the right hand step, and this request is sufficient, so that there has been no increase in missed fares.

Altogether we feel that this new type is a logical development and is eminently satisfactory, and believe that where heavy traffic is to be handled, serious consideration should be given by railway managers to the purchase of front-entrance one-man cars, equipped with separate exit and entrance passageways.

Fare Box That Makes Change

THE Automatic Coin Change & Record Machine Company, New York City, has developed a new type of fare box especially adapted for use on electric roads. This machine automatically collects and retains the stipulated amount required for fares, makes and delivers the correct change to passengers, sorts and stacks the coins received, records the number of persons paying, totals the amount of money received, records transfers received and rings a bell for every transaction. The machine is 15½ in. x 9½ in. x 7 in. in size and weighs 36 lb. It is arranged for convenient mounting on a pedestal, and can be detached so as to be carried from one end of a car to the other as required.

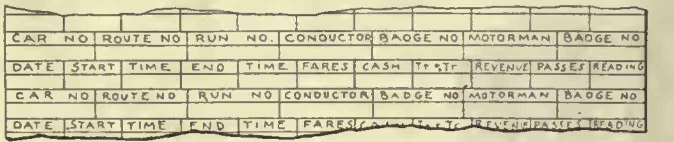


CHANGE ISSUING MACHINE

The top portion of the machine is occupied by a row of coin receptacles, each marked with conspicuous figures to indicate the value of the coin to be received. When a passenger places a coin in its receptacle, a small indicator is raised which shows the amount of change that is to be delivered to the passenger. The inserting of a coin unlocks the machine's mechanism and permits the operator to raise a lever. The initial movement of this lever closes the coin discharge box which is at the bottom of the machine. Further movement of the lever drops the coin received into its proper tube and discharges the coins to be given as change. The release of the lever opens the discharge box so that the passenger can receive his change. If the fare is 7 cents and the passenger inserts a 50-cent piece into the machine, 7 cents is retained by the machine when the conductor raises the lever and 43 cents change is delivered to the passenger directly from the machine. The coins received are sorted and stacked in tubes, thus keeping each denomination by itself. At the same time the number of fares collected is recorded on one register, while the total amount of money collected is recorded on another. Should a passenger find it necessary to tender a bill for his fare, the machine issues change for $1 by the operator pressing a small lever at the side. At the same time one fare is registered and a small indicator is raised showing the amount of change which is to be delivered. The discharge tubes for holding coins to be issued as change are separate from the receiving tubes, but the former can be replenished from the latter or otherwise as desired. The various tubes are arranged with a bottom slide, so that their entire contents can be dropped at one operation. The box is arranged so that it can be locked, making it impossible for any money which has once entered the machine to be handled by unauthorized persons. The machine can be set for any desired fare from 5 cents to 10 cents, by changing the penny slide. If the exact fare is deposited, of course no change is delivered, but the transaction is recorded in the usual manner.

A TRANSFER REGISTER FOR INCOMING PASSENGERS FORMS A PART OF THIS MACHINE

In addition to the fare collection and change-making mechanism, the machine is provided with a transfer register for incoming transfers and a record box which holds a roll of paper printed to cover the different items on which the railway company wishes a report from the conductor. An accompanying illustration shows a section of one of the printed rolls. Of course, the report may be changed to suit any condition as desired by the railway company. In making out his report, the conductor enters the various items as designated, closes the cover and turns the knob and the blank is then ready for the next record. The operating lever of the machine has a removable handle which can be retained by the operator in the event that it is necessary for him to leave the car.



PRINTED RECORD FOR CONDUCTOR

Some of the advantages claimed for the machine are, that the passenger inserts his own coin, or coins, into the machine and receives his own change from the machine. The conductor does not touch the money in any manner whatsoever. The machine is absolutely locked and cannot be operated unless a fare is collected. As the coins are inserted in the machine, they are sorted and stacked in tubes according to denomination. The stacked coins can be taken directly from the tubes and dropped into coin wrappers ready for deposit in banks if desired.

In addition to being a time saver the fare box machine insures mechanical accuracy in making change and permits the conductor to attend to his other duties in a more efficient manner.

Letter to the Editors

Discussion on Association Reorganization

FOUR COMMUNICATIONS *discussing the recommendations with reference to the reorganization of the American Electric Railway Association and its affiliated associations were published in last week's issue. The communication given below is likewise directed toward this same subject. The columns of the* ELECTRIC RAILWAY JOURNAL *will be open to its readers for the discussion on these points in the other three issues which will precede the convention.*

THE CONNECTICUT COMPANY
NEW HAVEN, CONN., Sept. 6, 1921.

To the Editors:

Answering your request to comment upon the report of the reorganization committee, I am sure I don't know what to say other than what I have said so many times before.

The original group that organized the association provided the most excellent medium for the exchange of information and discussion of policy throughout the electric railway fraternity of the country. The by-laws as originated by that group and amended from time to time have in general been sufficient for the guidance of the activities of the association, but I think all of us who have had anything to do with the workings of the association for the past few years have felt that the affairs of the association and the electric railroad interests of the country have outgrown the prescribed limits of the association and its duties and activities as defined by the by-laws.

Of course, the last few years have very materially changed all the standards as to policy and operating methods of the electric railroads and likewise have brought about the great changes in the work which the association should do to be of great value to the industry. This naturally brought about a real need for an entire revision of the machinery of the association.

It seems to me that the reorganization committee has done an exceptionally good job, and while there may be reasons for not heartily approving this, that or the other proposal as presented, the general result is most excellent and I believe that the final recommendations as coming from the executive committee should receive the hearty approval of all concerned.

Personally I think it would be better if the original recommendation of the committee is adopted relative to the relation of past-presidents to the executive committee. I have heard criticism of the requirement for a fixed date for executive committee meetings, but I think this is one of the most desirable of the features presented as the association needs the constant attention and guidance of those individuals in the industry who are actively engaged in the promotion of the industry itself.

I sincerely trust there will be no material modification from the proposal as presented to the convention.

You see that I can say nothing whatever that will be of any help in the real discussion of the issues, I am so thoroughly convinced of the necessity for making the changes and the desirability of adopting the plan as presented by the committee and approved by the executive committee. L. S. STORRS, President.

Transit Tendencies in New York City*

By LeRoy T. Harkness
Member of the New York Transit Commission

The author first briefly recounts a history of the development of the electric railways in New York City and the conditions which brought about the depressed financial condition of these properties. He then outlines the purpose and powers of the present Transit Commission. In conclusion he says: "In meeting the governmental problems resulting from or brought to a focus by the World War, there is needed proper statesmanship that will not confine itself to measures of repression but will consider it its main and most important duty to search out and to relieve the underlying causes of public dissatisfaction and unrest. The situation of electric traction throughout the country furnishes not only the most immediate but also one of the biggest instances of the opportunity for the exercise of such statemanship."

THE New York City transit situation, with its many, varied and complicated problems, presents, in perhaps the extreme form, the crying need for the adoption and application of public utility policies that are in full accord with changed conditions.

Transit has long been a political football, and that condition will continue while old sores remain and there is continual friction between the traction companies and the public. The attempt is now being made in New York City to develop a comprehensive and thoroughgoing plan of readjustment that will remove the old sores and causes of friction and permit transit to be viewed in its true light as an economic proposition.

The general features of the New York situation are well known. Systems of transit lines aggregating 1,800 miles in single track mileage, with outstanding securities approximating at par a billion dollars, are either in or on the verge of receiverships. In other parts of the country the financial difficulties of traction companies growing out of the World War have been met partially or completely and in general the situations are not acute. In New York City no relief has been obtained by the transit companies except through a cutting down of the number of free transfer points largely through the separation of lines under receiverships.

In addition to the inflation produced by the World War, the New York conditions are exceptional because of the element of a tremendous suddenly added competition due to carrying out the 1913 program, which involved the more than doubling of the rapid transit lines within a period of five years. Through the abolition of free transfers a large part of the public is paying an increased fare and the congestion is becoming progressively worse. On most of the lines conditions in the rush hours are a physical and moral menace.

The condition of the companies as viewed by the investing public may perhaps most readily be shown by contrasting the market prices of certain securities in 1917 and 1921, which is done in the following table:

BONDS	1917		January 1921	
	H.	L.	Bid	Acked
N. Y. Railways, Refg. 4's	76⅞	54	18	20¾
N. Y. Railways, Adj. 5's	60½	22⅛	3¼	3⅞
Third Avenue, Refg. 4's	82½	65	40⅞	41⅛
Third Avenue, Adj. 5's	81	38	25	25⅝
I. R. T. Refg. 5's	99⅝	76½	49	49¼
Bklyn. Union El. 1st 5's	101½	88½	57½	58
Manhattan Consol. 4's	94½	81⅛	53	56¼
STOCKS				
I. R. T. Consol	17⅛	5½	4¼	4⅜
I. R. T. Refg	72¼	39½	11¼	11½
Third Avenue	67¼	17¼	13¼	14
Manhattan El	132	115	48	49
B. R. T	82	36	9¼	10

The question naturally occurs: If most of the cities in the country have relieved their traction situations by increases in fares, why has not New York City done so? To those who have examined the situation superficially a sufficient answer has been found in the hostility of the city administration. The city administration has been vigorously and bitterly opposing an increased fare. It has done nothing to relieve the situation except in so far as minor and isolated bus operation has served a few thousand people and a few localities. But the city administration would not have persisted in this course, nor would it have been sustained by public opinion, if the differences and difficulties had not gone far deeper than a mere matter of an increased rate of fare. The scandals connected with traction reorganization and speculation have probably been more flagrant in New York than in any other city in the country. The traffic congestion and poor service have been such as to cause real suffering. The past intolerance of public opinion on the part of railroad operators and their interference in politics and legislation have not been forgotten. This is the background of the transit fight in New York City, and because of it a very large part of the community has looked upon the company requests for rate increases with suspicion and considered them as attempts again to exploit the public for speculative and stock-jobbing purposes. It is this very strong feeling that the municipal administration has shrewdly appealed to, and its strength is perhaps indicated by the fact that in the pending municipal campaign the opposition parties are endeavoring to avoid the traction issue by also declaring for a continuance of the 5-cent fare.

The unfortunate part of the entire situation is that with traction in an admittedly deplorable condition and growing progressively more incapable of meeting the public needs, the local authorities have followed a drifting policy, have been guided by expediency and not principle, and have offered no real solution. What has been lost sight of is the fact that, even admitting all the alleged misdeeds of the past, transit in a city like New York is absolutely vital to the well-being of the community. It must be put upon a basis where adequate service can and will be provided. If the difficulty lies in the present character of the relationship of the companies to the public and the city, and in existing organization and financing, necessary changes must be made to put the companies in a position where they can meet the public needs. The policy of mere obstruction in the long run must prove disastrous to the city, to the public and to the investors alike.

It is this critical situation that led to the transit legislation of this year, which will later be considered at some length.

Properly to appreciate the real issues and the special problems to be solved it is necessary to go back and briefly outline the development of transit in New York and note the underlying causes of the present antagonisms.

GENERAL OUTLINE OF NEW YORK TRANSIT HISTORY

In the earliest days New York transit companies were directly chartered by special statutes. Some surface lines are still being operated under old steam railroad charters. Other lines are successors in ownership to old-time plank-road companies. In the main, however, the present surface lines grew out of the old horse-car companies that were developed during the period prior to 1890. The old horse car lines were projected during the times when the city was rapidly growing and, therefore, were in the main consistently profitable. Naturally, at that time, their value as an aid in the general development was appreciated and there was little or no objection to their perpetual franchises and the lack of financial returns directly to the city. Unfortunately, in certain instances—notably the so-called "Jake" Sharp franchise for the Broadway line—there was flagrant corruption and bribery and the public has since been led to believe that this condition was far more prevalent than it really was.

From 1865 to 1890 was the main period of elevated railroad development during which the Manhattan Elevated System and the Brooklyn Union and Kings County Elevated Systems were constructed. In the first stage of this development—prior to 1875—the franchises were granted by special acts of the legislature, and afterward by separate commissions appointed under the rapid transit act of 1875. Here too, of course, the lines were privately-owned under perpetual franchises with practically an entire absence of provision for public control.

In 1875 an amendment to the state constitution was adopted which prohibited private or local bills granting railroad rights.

This stopped the evil of special legislative railroad grants. The attaching, by the municipalities, of conditions as to rates of fare in giving their consent has furnished an important element in the situation and presented the question whether the legislature under the reserved police power can over-ride the action of a municipality in attaching a fare limitation in its consent. It is on this question that the fare litigation of the past few years has largely turned. (*Matter of Quinby* vs. *Public Service Commission*, 223 N. Y. 244; *Matter of International Railway Co.* vs. *Public Service Commission*, 226 N. Y. 474; *People ex rel. Garrison as Receiver* vs. *Nixon*, 229 N. Y. 63.) In the Garrison case the Court of Appeals in effect decided that the legislature had the power to alter rates of fare in franchises or consents granted prior to 1875 and subsequent to 1907 (the date of the enactment of the public service commissions law) but left open the question as to the power of the legislature over the fare limitations in municipal consents granted between 1875 and 1907. Recently the Appellate Division of the Supreme Court in the First Department has sustained the validity of the transit legislation of 1921 which expressly gives the commissions power to raise rates despite provisions in local consents (*City of New York* vs. *McAneny*, decided July 1, 1921).

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*Abstract of a paper read before the Public Utilities Section of the American Bar Association, Cincinnati, Ohio, Aug. 30, 1921.

The decade from 1890 to 1900 marked in New York as in other parts of the country the development of electric traction. The prospects for its success were exceedingly bright but unfortunately it was in great part financed on a highly speculative basis and was attended with the then common practice of stock watering.

Looking back over this period we see that it was the time of company exploitation. The grants were all perpetual, in most cases without provision for any payment to the city and without control by the municipality over construction or operation.

The construction of the elevated railroads failed to keep pace with the growth of the city and the construction of additional lines was constantly agitated, finally resulting in the passage of the Rapid Transit Act of 1891. This act provided that the Rapid Transit Board could lay out routes without reference to whether they were connections or extensions of existing lines, and, after obtaining the necessary constitutional consents, should offer the franchise for sale at public auction. Acting under the broad powers conferred upon it by this act the new board promptly adopted a route and general plan for an underground railroad under Broadway with elevated extensions in the northern part of the city, but the franchise when offered for sale at public auction failed to elicit a satisfactory bid.

Then came the then revolutionary proposal that the city should build and own the new roads and lease them for terms of years to operating companies. The Rapid Transit Act was so amended in 1894 and the Rapid Transit Board promptly proceeded to take the necessary steps preliminary to making a contract, but the difficulties to be overcome were so many and so great that it was not until Feb. 21, 1900, that the board was in a position to enter into the first contract. It then contracted on behalf of the city with John B. McDonald (Contract No. 1) to construct, equip and operate the so-called Manhattan-Bronx Rapid Transit Railroad. The construction price was $35,000,000 with certain additions for real estate and terminals. The contractor was obligated to furnish the equipment. The lease was for fifty years with a twenty-five-year renewal. The rental was the minimum permitted by the act—interest on bonds issued by the city for construction plus 1 per cent.

When this work was well under way the Rapid Transit Board also let, in 1902, to interests affiliated with Mr. McDonald, the contract (Contract No. 2) for the construction, equipment and operation of the so-called Brooklyn-Manhattan Rapid Transit Railroad, being an extension of the first subway to Brooklyn. The rental provision in this later contract was substantially the same, but the original lease term was shortened from fifty years to thirty-five years.

Realizing that the construction of the first subways was but a beginning and that extensive additional lines were necessary to keep up with the increase in traffic, the Rapid Transit Board, as soon as the first contracts were placed, proceeded with plans for new subways and continued negotiations for leasing them. As a result, it was finally possible in 1913 to enter into what are know as the Dual Subway Contracts, which involved a joint city and company expenditure estimated at that time at $335,000,000 and which, by reason of increased war costs, has gone well over the $400,000,000 mark.

In these contracts the companies would not agree to rental provisions similar to those in the first contracts. Looking at the situation from their standpoint, however, it must be said that there was justification for their insistence upon having a prior lien on the earnings. The Dual Subway plan involved the more than doubling within a period of five years of rapid transit lines in the city at a cost then estimated at about $335,000,000. This unparalleled expansion was necessary for the well-being of the city and for that reason it was thought that the city could afford to enter upon it even in the face of inevitable deficits during the early years of operation. On the other hand private capital had to look at the matter solely from a hard-headed dollar-and-cents point of view and could hardly be expected to enter upon the project unless its returns were amply safeguarded and it was protected from deficits almost from the start.

Under the new plan the city's returns were subordinated to the companies earning their existing income and 6 per cent upon the new money provided by them. The situation was somewhat akin to the city's taking a second mortgage. The various estimates used in forecasting financial results were all dependent upon certain assumptions as to increase of population, ratios of operating expenses and the like which were bound to be more or less colored by one's point of view. Even the most favorable estimates indicated that the city would have to bear deficits for a number of years to come and therefore be subjected to the experience of raising amounts to pay these operating deficits either from its tax levy or through some refunding operations. The allowance to the companies as part of their preferential payments of their then existing profits,—$3,178,000 a year in the case of the Interborough and $1,500,000 in the case of the B. R. T.,—placed a heavy burden upon these roads, representing as it did the extraordinary profits swollen by the intense traffic congestion of the two years ending June 30, 1911. Naturally, as new lines were placed in operation they would relieve this congestion and thereby cut down, if they did not for a time destroy, these profits, but, unless the right of recapture were exercised, the new lines would have to bear this burden for half a century.

The foregoing very generally outlines the history of the development of transit in New York City. One tendency is very plain: municipal ownership is not a new thing in New York but represents a settled policy long in effect and steadily growing in popular favor and importance since its original adoption in 1894. From it flows two results that are setting in train tendencies that even now point rather definitely to certain conclusions. In the first place, the city in 1894 in effect decided to go into the railroad business and has already put into operation two great transit programs—the subway expansions of 1900-1902 and 1913—with a city investment of over $250,000,000. As a railroad owner the city cannot stand still. It must not only continue to expand its own lines but the logic of events points to its also increasing and already dominant position in the transit field by swallowing private lines. In the second place, the city must take steps to protect its investment under the 1913 contracts and set up a new kind of participation that will insure its receiving a proper return so as to relieve its tax budget and also to provide funds for further subway extensions.

UNDERLYING CAUSES OF ANTAGONISM

Bad service is, of course, a continual irritant. But back of that there is in the mind of the public the remembrance of past transactions. To appreciate the public point of view and the difficulty that always besets any attempt to consider transit problems on their merits it will be helpful to consider a few of the more notable grounds of controversy.

In the early days there was flagrant corruption in obtaining some of the franchises and the "Jake" Sharp manipulation of the Broadway surface line is the example most often referred to. The Metropolitan Street Railway financing, too, has left bitter memories in its wake.

In 1902 when the subway work was well under way the Interborough Rapid Transit Company, to which Mr. McDonald had assigned the operating rights under Contracts 1 and 2, leased in perpetuity the Manhattan Elevated System under a lease which provided that the lessee should pay the interest on approximately $45,000,000 of the lessor's bonds and pay 7 per cent per annum upon the $60,000,000 of the lessor's capital stock, together with taxes which amount to over $2,000,000 annually. This lease has been the subject of severe public criticism, especially during this period of increased costs when the operation of the combined elevated and subway system was burdened with paying what were in effect 7 per cent dividends to the Manhattan stockholders, while the net receipts from operation were so low as to threaten a receivership at almost any time.

The Manhattan Company also carried a heritage of public antagonism because of its past collisions with the public. One of the bitterest of these fights was the one for the reduction of the fare from 10 to 5 cents, which was finally forced by the enactment of Chapter 743 of the Laws of 1894.

Soon after the building of the first subways came the Interborough-Metropolitan combination. The competition between the Interborough Company's subway and elevated systems and the Metropolitan Street Railway's system reached the point where it was possible for certain financial interests to force a combination. There was, therefore, organized a holding company first known as Interborough-Metropolitan Company, which held practically all the stock of the Interborough Rapid Transit Company and of the Metropolitan Street Railway Company. This was most unfortunate for rapid transit, because, aside from the throttling of competition through combination it largely turned the control of the Interborough properties over to those interested in the street surface lines and thereby prevented the city's operator from considering the matter of rapid transit development solely from the standpoint of a rapid transit operator.

This also gave ground for public resentment because, without the city having any say in the matter, the city railroad, upon which approximately $50,000,000 of public money had been spent, was made one of the main points in a financial maneuver that was actuated primarily to throttle competition and raise the market value of the various securities.

During the period from 1890 to 1900 there also took place the consolidation in one form or another of the surface and elevated lines in Brooklyn to form the Brooklyn Rapid Transit System. The scandals connected with the Metropolitan Street Railway combination fortunately were not duplicated, but in some of the companies there undoubtedly was considerable water and the consolidation was attended with a burst of speculation, B. R. T. stock at one time being forced up to around 130.

Another matter, perhaps small in comparison but affecting a class of the community least able to bear a loss—the tort creditors—was the corruption of juries in accident cases. It is greatly to the credit of the present heads of the companies that in this respect they themselves cleaned house and did it with ability and thoroughness.

At the time the Dual Subway contracts were entered into there was, of course, no thought that shortly more than a year later a world war would break out. The prospective burden upon the city in carrying its investment was serious enough under normal conditions, but the effect of increased costs due to the war has completely altered the situation. The city has not yet received interest and amortization charges on its new investment. Even with preferential rights the Contract No. 3 company deficit now amounts to over $25,000,000 and the Contract No. 4 company deficit, to over $10,000,000. The extent of the city's burden is indicated by the fact that in its annual budget it is now including an amount approximating $10,000,000 to meet interest and sinking fund deficits on the rapid transit account. Having in view the large cumulative company deficits (and under Contract No. 3 the deficits are cumulative at compound interest), which must be wiped out before the city receives its fixed charges, it is probable that if the contracts are permitted to continue as at present the city will never receive any return under them. This not only subjects the tax budget to this enormous drain but also operates as a bar to needed further subway expansion because, until it is in receipt of sufficient current funds to carry the annual charges on this investment, the city cannot exempt equivalent amounts from the debt limit and use them for any new work.

The declaration of large dividends by the Interborough Company and its attitude in respect to changes in its contracts with the city had had an important effect in preventing a readjustment. The 1913 estimates indicated a number of lean years, due to putting the new lines in operation and the attendant heavy interest burden. Then came the World War and the consequent certainty of inflation. These factors should have dictated extreme prudence and the husbanding of resources. In spite of this, however, the Interborough Company declared dividends of 20 per cent in 1915, 1916 and 1917, and 17½ per cent in 1918. When it felt the full effect of its interest burdens and war costs it applied to the city authorities for a modification of the subway contracts so as to provide for an increased rate of fare. The company, however, was averse to any other change in the city's interest. This had a most far-reaching effect on the working out of a solution of the transit problem. The public not unnaturally, in view of the fact that the company had so recently been declaring such unusually large dividends, was suspicious of its good faith and antagonized by the attitude of demanding something and conceding nothing.

Before considering possible measures of relief, it will be of assistance briefly to chart the underlying causes of the present unsatisfactory relationship between the companies and the public and the city.

PUBLIC GRIEVANCES

1. Service has been bad and a considerable part of the public has undergone real inconveniences and sometimes actual suffering twice a day for six days a week. Many of the roads are in badly depreciated condition; for example, some still using rolling stock thirty years old.

2. The public believes, in view of the enormous traffic in New York City, that transit is or should be very profitable. (The unduly large dividends paid in recent years by the Interborough Company are taken as strong confirmation of this belief).

3. With this belief the only explanation that accounts to the public satisfaction for the bad service is that the companies are really making large profits but are concealing them through excessive rentals and capitalization and using these excesses again as a reason for cheapened service to pay returns on water.

4. The very unsatisfactory situation of the city's great investment in the subways.

These are grievances and in so far as they are justified in fact constitute, of course, valid objections to increased fares.

Beyond this, and one of the main grounds of public antagonism, is the past interference of public utility interests in politics. The public's idea of the influence now wielded by those interests is exaggerated, but the enmity resulting from past struggles is lasting.

COMPANY GRIEVANCES

On the private side the investors, too, have their grievances. The transit properties, even though impaired, represent investments running into the hundreds of millions and furnish an indispensable service to which we have become so accustomed that we take it largely as a matter of course, and without any adequate realization of the extent to which the well being of the community is founded upon it. The securities of the companies are widely distributed, generally in small holdings, and the public interests, as well as good morals, require the protection of proper bona-fide investment.

For the past few years all the companies have been hard hit by the same trouble that has affected every individual and business in the country—the decreased purchasing power of money. Operating expenses that before 1914 would run around 50 per cent of revenue have jumped to 85 or 90 per cent, or higher. As a result of this decrease in purchasing power, wages have had to be largely increased. The companies have, therefore, been in the position of having to meet the existing economic situation in paying bills, but have been unable (except partially in the case of abolition of or charges for transfers) to have that situation recognized in respect of payment to them for the services they render. With business generally meeting such a situation by raising charges, holders of utility securities are aggrieved by the refusal to let them follow the same economic law even in cases where returns will not pay operating expenses to say nothing of interest on bonds.

There are two other subordinate but nevertheless important grievances of the transit companies: Street paving and maintenance charges and taxation.

The companies are required by law to pave and maintain the paving between the tracks and for a certain distance outside the tracks. They claim that while these charges may have been proper in days gone by when horse car operation did damage the pavement, they are not proper now when the electric-car operation does practically no damage and when the great wear and tear is occasioned by heavy trucking. The paving expenses for the year ending June 30, 1920, were:

B.R.T. Surface Lines	$449,308.35
New York Railways	288,282.46
Third Avenue Railroad	527,691.08
Total	$1,265,281 89

The burden of taxation has been steadily increasing. New York state and city taxes for the year ending June 30, 1920, were:

Interborough Rapid Transit System	$2,529,517.54
Brooklyn Rapid Transit System	2,005,892.33
New York Railways System	1,002,850 58
Third Avenue Railroad System	756,019 43
Total	$6,294,279.88

A large part of this taxation is imposed through the special franchise taxes, the theory of which is that the companies should be required to pay taxes commensurate with the value of the rights granted by the public. However just such a tax may be in principle, the burden on transit operation is exceedingly heavy. Moreover the adoption of the principle of regulation as exemplified in the Public Service Commissions law has worked a change from the situation as it existed at the time the special franchise tax was first enacted. The better view is that the return to the public should be in service and not in taxation and that if the revenues become more than needed for adequate service, the proper remedy is a reduction in rates. At the present time as the subway properties are owned by the city, the Interborough and B. R. T. are substantially free from taxation in connection with the operation of city-owned properties, while the elevated and surface lines bear an increasingly heavy burden.

The public and private attitudes may, therefore, be summarized as follows:

Public : Dislike and distrust founded on

1. Bad service.
2. Belief in existence of excessive returns, rentals and capitalization.
3. Belief that rights and functions exercised by the companies are antagonistic to the public interest.
4. Unsatisfactory situation of the city's transit investment.

Private: Distrust and bitterness founded upon believed injustice

1. In not being allowed the same privilege as business generally of increasing rates to meet increased costs,
2. In unfair street paving and maintenance charges, and
3. In excessive taxation.

In working out any solution of the transit problem, these other elements must be considered.

The companies took franchises and contracts based on 5 cent fares with the expectation of large profits both from dividends and increases in the market value of securities. Most of the stocks were speculative to a high degree. The companies heretofore have insisted on the rigidity of the 5-cent fare—American urban traffic was based upon it, franchises had been granted and contracts let in reliance upon it and, therefore, it could not be disturbed. This, before the war, was the companies' position. They, however, have changed their base and see now, not profit but loss and possible disaster in a fixed rate of fare. In short, they ask that the underlying basis upon which they entered the transit field be changed from risk to protection, their securities from a speculative to a stabilized character. With such a radical change it would seem that they themselves should recognize the entire justice of requiring the readjustment of their engagements with the public as expressed in outstanding franchises and contracts to accord with the new base.

Furthermore, a readjustment necessarily involves the element of consolidation, for otherwise a flexible fare does not seem practicable. Relatively, the surface lines are much worse off than the rapid transit lines and, therefore, more in need of relief. But an increased fare on the surface lines alone would drive the greater part of their traffic to the rapid transit lines and leave them worse off than before. A similar raise of fare on the rapid transit lines would give them more than they need and, therefore, amount to overcharging the public using them.

In the case of the surface lines, and to a much lesser and possibly negligible extent in the case of the elevated lines, the projection of the lines was originally on a competitive basis. There are even now existing a multitude of companies that were engaged in the building of these lines. Gradually the lines were absorbed in large systems, especially during the period of electrification. Despite this absorption and the substitution of virtual monopoly for competition, there was little or no attempt to revamp the lines to accord with the changed conditions. Furthermore, in 1900-1902 and in 1913, the city placed under contract great subway systems that radically altered the transportation map. Again, there was no attempt to revamp the surface lines to meet the changed conditions and this suddenly added great competition. The reason for this, in most cases, of course, is patent. The existing lines were covered by existing and generally blanket mortgages and the franchises and financial structure was too rigid readily to be changed. So that there is also involved the important element of revamping existing lines to meet present needs and conditions.

ELEMENTS OF A SOLUTION

This, then, in general was the situation and the "set-up" when the companies felt the full force of the increased prices growing out of the World War. In December, 1918, important companies of the Brooklyn Rapid Transit System went into the hands of a receiver, to be followed soon after by the New York Railways Company operating most of the surface lines in the Borough of Manhattan. The Interborough Company has only avoided a receivership with extreme difficulty. The efforts of the companies to secure increased rates of fare were bitterly fought in the legislature and the courts. The disintegration of the big B. R. T. and the New York Railways systems began and was continued by sluffing off through the receiverships of important lines. Service became progressively worse and public resentment increasingly bitter. This condition continued for over three years before a real effort was made constructively to meet the situation.

Early in this year's session of the legislature Governor Miller, in a special message, directly faced the issue and recommended the delegation and concentration of all the powers the legislature could grant to a commission to be composed of three members. This precipitated one of the bitterest political fights in years and the legislation was vigorously attacked on the ground that it violated the principles of home rule for municipalities and was a "fare grab." Of course, the bill did not raise any rate of fare but merely empowered the new commission to raise a rate if necessary and the home rule argument largely lost its force because of the utter failure of the local authorities to attempt any constructive measures of relief.

The legislation (Chapter 134 of the Laws of 1921 as amended), however, bears upon its face proof of the endeavor to reach down and remove the underlying difficulties and causes of antagonism. It provides for the commission preparing a plan of readjustment that will accomplish as nearly as may be the following three main purposes:

1. The combination, rehabilitation, improvement and extension of existing railroads so that the service thereon may be increased and improved to the fullest extent possible.
2. The receipt as soon as practicable by the city of sufficient returns from the operation of the railroads so that the corporate stock or bonds issued by the city for the construction of rapid transit railroads may be exempted in computing the debt incurring power of the city under the constitution of the state, and
3. The assuring to the people of the city the continued operation of the railroads at the present or lowest possible fares consistent with the just valuations of the railroads and their safe and economical operation.

To carry out such a plan of readjustment the commission is vested with the broadest powers to vary rates (including the power to vary rates fixed in municipal consents and contracts), to revise existing contracts and to make new ones and to value and acquire railroad properties for and in the name of the city. Provision is made for submitting the plan and contracts to the local Board of Estimate and Apportionment, but if that board finally refuses to approve, the ultimate power to carry the plan into effect is vested in the commission.

An important and interesting feature of the legislation is that respecting valuation. This provision is:

> In connection with the preparation of such plan the commission shall cause a valuation to be made of the property, other than franchise or going value, necessarily used in public service of the railroads it proposes to include therein. Such valuation shall be made with due regard to the estimated prospective earning capacity of the property necessarily used in the public service at the rate or rates of fare that the company prior to the taking effect of this act was entitled to charge in view of the provisions of the contract or franchise under which the property is operated or held or of any lawful order in force fixing or regulating rates of fare and of the competition of other lines and with due regard to all other pertinent facts and conditions; but such valuation shall not in any case exceed the fair reconstruction cost of the property less depreciation. Such valuation shall be in such detail and shall include such elements of cost or values and shall be made in such manner as the commission may prescribe. Such valuation as finally determined by the commission shall be the basis for all allowances to the railroad companies under the plan and for thereafter fixing the return on the property so valued, anything in this chapter to the contrary notwithstanding.

The theory of this provision is that in approaching this subject the point of view would be largely that of a banking house considering the purchase of a transit property. Its natural first question would be: "What will the property normally earn considering any franchise or charter limitations and any other incumbrances?" So, if under the plan it be decided to take over any given road, the normal earnings would first be considered and capitalized. The earnings would, of course, be upon the basis of the present fare engagements—almost universally 5 cents—but the returns would be estimated during a normal period—for example, averaged over the next ten years—for present conditions are abnormal and taking over roads on present earnings would amount to virtual confiscation. Against the figure thus obtained would be checked a figure obtained on some reproduction cost basis. It will be seen that these provisions are very general and much more indefinite than formulas usually applied in rate cases. This is necessarily so, first, because a rigid formula could not be adopted that would be sure to meet the widely varying circumstances and conditions of the many different lines and second because if it were attempted to handle this valuation in the same manner rate case valuations usually are handled years would elapse before the work would be completed.

The practical aspects of making these valuations offer many interesting features. It is not purposed to duplicate the usual "nut and bolt" inventory where everything in the minutest detail has to be examined and counted. In general it should be possible to take the plans and records and compute quantities from them and check conditions by a field inspection. It is believed that in this way substantially the same results would be obtained without the usual large expenditure of time and money.

In a public letter dated Feb. 11, 1921, Governor Miller, in describing the purposes of the legislation recommended by him, outlined a possible plan of readjustment, as follows:

> 1. The value of the physical property used in the public service, without reference to present capitalization, should be determined. The data for such valuation of many of the lines must already be in the possession of the present commission. It should not take long to make a valuation of the others.
>
> 2. Eliminate all outstanding inter-company leases.
>
> 3. Retire outstanding securities, except such underlying liens as cannot readily be retired, for which provision looking to eventual payment must be made.
>
> 4. Vest in the city title to all lines not already owned by the city, free and clear of all incumbrances, except such underlying liens.
>
> 5. Make a lease to a new company, which shall provide for amortization of the determined valuation and for adequate reserves for depreciation, contingencies, and the like.
>
> 6. Mortgage such lease to an amount approved by the commission, and issue stocks and bonds not in excess of the valuations determined by the commission, in exchange for the securities retired.
>
> 7. To promote prompt reorganization and revamping of lines without assessing security holders, defer interest and dividends for one or two years, as might be determined by the commission, and at the end of such period prescribe a rate of fare sufficient to pay all charges provided for in the lease.
>
> 8. As an incentive to efficient management provision could be made for increased return on capital as fares are decreased, and a reduced return as they are increased.
>
> 9. Looking to the eventual transfer of general regulatory powers to the single state-wide public service commission, provision could be made for a board of control, on which the city and the company should have proper representation. The alternative to that would be representation by the city on the board of directors of the company. The board of control plan is probably preferable, and that board might well have the powers of the present Transit Construction Commission.
>
> 10. As all approved charges will adequately be provided for under the plan, the provisions of the dual contracts for preferential payments could be eliminated and such other changes made as will fit these contracts into the plan, and as may appear to be in the public interest.
>
> 11. Provision for the imperative and immediate needs of the city for further transit facilities should be made promptly.

To many a plan involving these fundamentals would seem extremely radical. The situation in New York City, however, is acute. Palliatives will not do. The case has gone beyond that and calls for surgery. So that the unusual scope and nature of the plan to be adopted must be considered in relation to the most unusual conditions that imperatively call for a remedy. Having set out at considerable length the general history of transit and some of the underlying difficulties and having indicated the fundamentals of a plan of readjustment, it should be helpful if in conclusion the endeavor is made very briefly to attempt to forecast the advantages that might be expected to flow from the adoption of such a plan.

ADVANTAGES TO THE CITY

Ownership—The city would get the ownership of the transit lines. They would be subject to a lease or leases, but the value of the lines would be amortized by the earnings and at the end of the term the city would own the entire transit system free and clear. Furthermore, as time passes the city through the mounting up of the amortization funds could terminate the leases and acquire possession on increasingly easy terms.

Division of Profits—If it should be decided that the parties in interest should divide any surplus, instead of having it applied either to reduction in rates or improvement in service, the city's present investment would furnish ample consideration for the city insisting on a large—or possibly a predominant—percentage of the profits. On the basis of proper capitalization with preferential profits eliminated and with the main existing obstacles to fare readjustment removed, the transit system should be profitable and on the return of normal conditions, if that course should seem preferable, the city should receive substantial profits from its transit lines.

Receipt of Fixed Charges on Subway Investment—Through the revision of the dual contracts and the elimination of preferential profits, the city would get out of its present unsatisfactory position and would receive presently interest and sinking fund payments on its investment in the new subways. Expressing it in another way: If the city does not take advantage of this opportunity to adjust the situation it would have to continue to pay out of taxes about $10,000,000 a year as interest and sinking fund payments on city bonds. Therefore, by this adjustment the city would insure the receipt of the fixed charges on its bonds.

Exemption of City Bonds—Such an arrangement would put the city bonds issued for transit purposes on a self-sustaining basis and permit of their exemption in computing the debt limit. This would increase the city's debt incurring capacity for transit improvements by more than $200,000,000.

Indirect Advantages—Of perhaps less material return to the city directly, but very material to its citizens, would be the revamping and rehabilitation of the transit lines that is a necessary element of the readjustment. This would permit of the substitution of good service where it is bad and would not only substantially ease, if not eliminate, the existing dissatisfaction, but would be reflected in all the varied business and financial activities and social and living conditions affected by the character and extent of transit service. The results should be especially apparent in the increased value of real estate—the city's main source of revenue.

ADVANTAGE TO THE PRIVATE INVESTORS

While the profit making and speculative elements would be eliminated the real values in the transit properties should be protected and securities stabilized by the official valuation findings and a proper provision for secured returns. The big profit making and speculative days have gone in transit in New York City and most investors realize that fact. A reasonable, assured return on a fair valuation seems to be the only basis on which the consolidated systems can permanently be financed.

Although it may be felt that with the transit companies under the present circumstances it is a case of "any port in a storm," nevertheless, considering such a readjustment from their standpoint broadly and fairly, it would not only give them a very good port but one in the long run better for their security holders than the pre-war one.

Nor are the immediate or proximate financial results of operation the only factors to be considered. Transit conditions on many of the lines are nothing short of disgraceful because of depreciation in structure and equipment and of cutting down of service, both to save expense. The roads and their equipment must be rehabilitated and adequate service must be restored. To do this new money in substantial amounts will be needed and more and better service must be given with consequently increased operating costs. Under the present circumstances the companies cannot meet these requirements. A continuance of present conditions, therefore, means a continuance of impaired service. That the public cannot be expected to submit to, especially if the companies are offered and refuse a fair plan of adjustment. The result would be that the companies would engage in intensified differences with the public, in which they would be bound to lose in the long run. Instead of this, under the plan proposed the main causes of friction would be removed; the companies would be assured of a fair return on actual values and their securities would be stabilized.

ADVANTAGES TO THE PUBLIC

It remains to consider such a readjustment from the standpoint of the third party in interest—the public as distinguished from the municipality. Taking up the public grievances as already listed:

1. *Bad Service*—The rehabilitation of lines and the modernization of equipment would physically fit the lines for giving proper and adequate service. The question of how intensively those facilities are operated would thus become a matter of the traffic available and the cost of operation with the determination of how much service is to be rendered in public control.

2. *Excessive Returns*—This fear on the part of the public should be disposed of by the determination of the real values of the transit properties and the elimination of "water" of every description.

3. *Antagonistic Rights*—A part of the community will probably never be satisfied with anything less than complete municipal operation. Generally, however, the elimination of perpetual franchises and other private rights and the restricting of the companies to the roles of lessees or operators should satisfy any reasonable objection to present conditions.

4. The unsatisfactory situation with respect to the present city's transit investment would be remedied.

The transit situation, and especially the present public resentment, should be considered from a far broader viewpoint than that of merely a settlement of an increased fare question of local nature. The dissatisfaction and unrest caused by the present ownership and operation of public utilities is acute. The effect politically is apparent and political success often goes, not to the deserving, but to the one who can damn railroad interests the loudest. In meeting the governmental problems resulting from, or brought to a focus by, the World War, there is needed proper statesmanship that will not confine itself to measures of repression but will consider it its main and most important duty to search out and to relieve the underlying causes of public dissatisfaction and unrest. The situation of electric traction throughout the country furnishes not only the most immediate but also one of the biggest instances of the opportunity for the exercise of such statesmanship. On the one hand is involved the proper protection of an investment running into the billions in one of the country's major industries and, through protecting that industry by readjusting it to meet modern conditions and policies, to reduce or eliminate one of the most prolific and important causes of public dissatisfaction and unrest.

Railway Accountants Discuss Commercial Power Customers

Delegates Enjoy Toledo Beach—Discuss Power Accounts and Methods for Computing Costs at Points of Delivery

THE forty-first meeting of the Central Electric Accountants' Association was held in Toledo, Ohio, Aug. 26 and 27, 1921. This meeting was one of unusual interest, there being an attendance of forty-eight, representing practically the entire railway membership of the association. Luncheon was served Friday, Aug. 26, at the Toledo Yacht Club, and all sessions were held at this club. The two papers were given by J. N. Hagan and F. E. Eaton, entitled "Power Costs and Method of Arriving at the Same at Point of Delivery" and "Handling of Light and Power Consumer Accounts" respectively.

In his paper Mr. Eaton, who is head bookkeeper of the Toledo Railways & Light Company, discussed briefly the method used for handling commercial customers by his company.

The operations essential to the handling of customers' accounts are classed in three divisions: (a) Origin of information, (b) record of information, (3) recapitulation. The customer's account is started on the books when he signs an application or contract for service. This contract is now the authority for the issuance of work orders to the proper departments to give the customer his connection to the lines. The executed order is returned to the contract department, where complete information is transferred to the original application and is then turned over to the house card clerk, who records the necessary information.

The bookkeeper then takes the order and from it makes up the customer's ledger sheet, on which is recorded such information as name, address, meter number reading, etc. Also, the meter reader slip is sent to the meter reading department. These slips are bound together in covers provided for them and are routed according to districts in which the territory served is divided. These books contain an average of from 200 to 300 slips, covering streets and numbers running consecutively north and south or east and west. Following this the meters are read and the meter books are returned to the bookkeeping department to have the indexes recorded and bills made out.

At the completion of the billing for each period, which may be monthly, bimonthly or tri-monthly, based on the number of consumers served, a recapitulation of the month's earnings or revenue is made on a form of stationery which shows classification of kind of current used, whether used for domestic or commercial purposes, and further classified as to whether the current is charged for at regular meter rates, contract or flat rate, readiness to serve, or minimum charges for services rendered. This recapitulation is added from the ledger or listing machines and the results checked and verified by comptometer, the totals of the distribution columns verifying the grand total. The recapitulation of the month's revenue from all divisions is then combined and reported to the auditing department and charged by them against the bookkeeping department.

Ledgers are bound bi-monthly, at the close of the billing period and at the close of the discount period. This divides the labor in finding balances and does not burden the bookkeeper unnecessarily, particularly during the billing period, as the balance taken at close of same is merely applying the cash received against arrears unpaid at the close of discount period.

In entering cash and charges on the merchandise ledgers, which are set up in the same rotation as the electric and gas consumers' ledgers, the flag system is used. After the sales and cash for each day are entered, a recapitulation is made of the previous balance, new entry and present balance at close of each day's business; in this manner taking daily balances of each clerk's work is a great help in preventing errors, which would be hard to locate in a balance of a month's business.

For taking care of complaints forms are provided on which requests for investigations and inspections are made. In order that errors in recording work orders be reduced to a minimum, a system is installed whereby all work orders that have been entered on ledgers are checked by a competent employee, particularly to see that the meter constants and rates are recorded correctly. Consumers and extension deposits are kept in separate ledgers and are handled by one of the older employees in length of experience and service and are balanced monthly with the control as shown on the general ledgers of the auditing department. A card system and loose-leaf ledger sheets are used.

These operations and methods as outlined have given abundant satisfaction in accuracy and efficiency and any time are open to personal inspection, and any inquiries in regard to the same will be given prompt attention.

The paper by Mr. Hogan on power costs is abstracted elsewhere in this issue of the ELECTRIC RAILWAY JOURNAL.

The report of the Committee on Freight and Express Accounts was adopted on the basis of the steam railroad practice in the settlement of differences on monthly accounts, the minimum amount of settlement being 25 cents.

The Astray Freight Waybill authorized at the January meeting was reported by the committee as ready for the printer, and it will be put into operation at once. The committee was authorized to complete the form for an Interline Unit Waybill to be used by member lines.

It was decided that the next meeting of the association would be held at Indianapolis, Ind., on Jan. 27 and 28, 1922. One of the special features of this meeting was the attendance of the wives and families of the members. On Saturday some of the accountants and their families availed themselves of the invitation of the Community Traction Company and spent the day at Toledo Beach, where all had an enjoyable time and good things to eat.

The following were elected to membership in the association: J. F. Keller, auditor of freight and ticket accounts, Dayton & Troy Electric Railway, Tippecanoe City, Ohio; F. M. Kemp, assistant treasurer, Gary & Valparaiso Railway, Gary, Ind., and D. A. Moore, secretary and treasurer, Community Traction Company, Toledo, Ohio.

Power Costs at the Point of Delivery on Interurban Electric Railways*

Power Costs Must Be Segregated When Commercial Consumers Are Supplied—Demand, Energy and Customer Costs Explained—Intelligent Rate Schedule Must Be Based on Accurate Power Cost Data

WHEN the majority of interurban electric railways were built but little consideration was given to the possibility of supplying commercial loads from the railway transmission systems. In most instances excess capacity was installed to permit of future expansion of the railway. Fixed charges and a large part of operating expenses, relating to the existing power system, were not increased by the addition of small commercial loads. In many cases the railway managements considered that the only increased expense would be in the coal bill, which at that time was a relatively small item. Based on this hypothesis, very low rates were made to attract as much commercial business as possible.

At this time a majority of interurban railways are carrying commercial power and lighting loads amounting to between 10 per cent and 30 per cent of the entire output. Due to increase in both railway and commercial loads, many power plants have been enlarged. The increasing importance of accurately determining the cost of power at the point of delivery is obvious.

The cost of supplying electric energy to consumers is made up of three elements, namely: (1) That portion of the total expenses fixed by the maximum demand on the system, which is often termed "Demand Cost"; (2) that portion of the total expenses which is proportional to the energy used, called the "Energy Cost," and (3) that portion of the total expense which is nearly proportional to the number of customers served, which may be called the "Customer Cost." It is evident, therefore, that there is no single unit of measurement which will accurately define power costs, as we think of the cost of an ordinary commodity. Obviously, since there are two cost factors in addition to that proportional to the actual energy used by any customer, the time-worn phrase, "Cost per kilowatt-hour," does not express the cost of supplying a particular consumer, but rather it expresses the average cost of supplying a kilowatt-hour to the average consumer on the entire system. If the load curves of all consumers were exactly similar, with peak loads occurring at the same time of day and year, then "Cost per kilowatt-hour" would be a true measure of the cost of supplying power. However, fortunately for all concerned, the peak loads of all consumers do not occur at the same time. Further, the ratio of maximum demand to average demand or load factor is different for the several consumers or classes of consumers.

NECESSARY TO SEPARATE COSTS

In the problem of the interurban railway it is necessary first to arrive at the division of demand, energy and consumers' costs for that portion of the installation used jointly by railway and commercial loads. This includes the costs incident to the power plant and main transmission system, but not including the railway and commercial power substations. To obtain an exact division of the costs, each railway substation and transformer substation on the main transmission line should be considered as a separate load.

Inasmuch as the demand cost is fixed by the peak load on the system, it is necessary to determine the degree to which each substation is responsible for the peak load, or, in other words, the capacity of the power system. Offhand, it would appear that the portion of the demand cost chargeable to each substation would be in the ratio of the load on that station to the total peak load on the system at the time of the system peak load. It will be seen that this is not the correct viewpoint, when it is pointed out that at the time of the peak load in a given year a large number of consumers may not be using any power. While it is true that certain consumers probably will have their peaks coincident with the system peak load each year, it is also true that a portion of the peak load will be made up of different consumers in succeeding years. If it were possible to obtain continuous load curves of every substation and of the power plant over a long period, the portion of the demand cost which each substation theoretically should bear could be calculated. Practically, this is not feasible.

The load curves of interurban power stations have characteristics different from those of the ordinary central station. During the hours of operation of the railway, the railway load is fairly constant. On ordinary weekdays a slight peak occurs during the morning and evening rush hours. However, on holidays, or when some local attraction results in passenger traffic above normal, the power plant may be called upon to supply a practically constant railway load, considerably higher than the weekday peak. The interurban railway peak load, therefore, may occur at any time during the day or evening and probably will vary in time in different years. It is apparent that a commercial load which occurs during any hour of the day or evening may coincide with the railway peak.

The peak load on a power plant or on any part of a system is always less than the sum of the peak loads of the constituent parts, due to a time difference between the peaks of the individual loads. This introduces a diversity factor which may be defined as the ratio of the sum of the consumers' demands to the peak demand on the system measured at the point of supply. Coming back to the question of determination of the division of demand cost between substations, it is reasonable to assume that the demand cost chargeable to each substation is proportional to the maximum demand of that substation, taking into account the diversity factor between the various loads. As an example, suppose that there are but two substations, "A" and "B." Suppose the maximum demand of substation "A" is 8,000 kw., that of "B" 6,000 kw., and that the maximum demand on the power station is 10,000 kw. The diversity factor of the substation loads is then

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*Abstract of article by J. S. Hagan, Westinghouse Electric & Manufacturing Company, before Central Electric Railway Accountants' Association, Toledo, Ohio, Aug. 26, 1921.

$$\frac{8{,}000 + 6{,}000}{10{,}000} = 1.4$$

Substation "A" should be charged with

the demand cost of $\frac{8{,}000}{1.4} = 5{,}710$ kw.

and substation "B" $\frac{6{,}000}{14} = 4{,}290$ kw.

In calculating this division of the central station demand cost, the maximum demand of each railway and commercial substation should include power plant, transformer and line losses, which can be calculated approximately. Neglecting power factor, line losses of a transmission system at any instant are not proportional to the power delivered, but to the square of the power delivered. In practice it is impossible to determine with exactness the line loss properly chargeable to each consumer. In so far as the main transmission line, used jointly by railway and commercial power, is concerned, it is usually sufficient to assume that the total line loss is divided in proportion to the energy consumption of the various substations.

The power demand of each substation can be obtained by the use of maximum demand meters. The demand of large commercial power substations serving a diversity of loads is difficult to estimate and always should be obtained either by the use of maximum demand meters or recording wattmeters. In this manner the total demand costs of power plant and transmission lines may be divided between railway and commercial power loads.

Each commercial substation with its distributing system must be considered separately, and the total costs incident to that particular distribution system should be divided in the manner previously described. The demand costs which consumers receiving power from a given substation should bear consist of the part of the main power system demand costs determined above plus all of the demand costs of the substation distribution system. The division of this total demand cost of a particular substation could be made between every consumer receiving power from that system. It is apparent that this calculation of the division of demand costs could be carried down to the individual consumer, but for practical purposes it is sufficient to determine the division between only a few classes of similar load characteristics.

The determination of energy costs for each consumer requires but little comment. The total energy cost of the central station and the energy cost per kilowatt-hour at the power plant busbars can be determined, as outlined before, from data easily obtained. It is again pointed out that losses in the distribution system should be added to the energy delivered, to obtain the total energy consumption charged to any consumer or class of consumers. Because of the difficulty in accurately separating losses in power station step-up transformers and main transmission line, this energy loss may be divided on a kilowatt-hour basis, where energy is metered at the substations.

The third part of the cost of power, namely, the customer cost, takes care of capital charges on customers' account and expenses incidental to billing and inspecting.

It should be borne in mind that this discussion is upon the determination of power costs, and not upon rates to consumers. While the fixing of rate schedules should be preceded by a thorough study of the costs, upon which any logical system of rates is based, there are many other factors involved.

Rate schemes are in use which take proper account of the division of power costs and yet are very simple. Even though it may be necessary to deviate somewhat from the theoretical costs of service for different classes of consumers, it is folly to attempt the determination of equitable rates without first knowing with a fair degree of accuracy the cost for each class of consumer.

Dinner to Returning Engineers

A DINNER will be tendered at the Engineers' Club on Oct. 10 by the national engineering societies to the returning members of the deputation which represented the John Fritz Medal Board in Europe. The guests will include representatives of the British and French societies by which this delegation was received. Invitations have also been extended to many men prominent in public life, including Secretary Hoover, Viscount Bryce and Secretary Hughes.

Ambrose Swasey of Cleveland is chairman of the John Fritz deputation, and the foreign organizations which will be represented include both British and continental engineering societies. A committee of arrangements has been appointed consisting of the secretaries of the A. S. M. E., A. I. M. & M. E., A. S. C. E., A. I. E. E. and United Engineering Society.

Iowa Association Meeting

THE mid-year conference of the Iowa Electric Railway Association has been definitely scheduled to take place on Sept. 15 and 16 at the Russell-Lamson Hotel, Waterloo, Iowa. The first session of the meeting will be at 9:30 Thursday morning, while an inspection trip and a banquet and entertainment have been arranged for Thursday afternoon and evening. The third and final session will begin at 9 o'clock Friday morning. Supplementing the information as to program printed in last week's issue of the ELECTRIC RAILWAY JOURNAL, the following information is available: F. V. Skelley, Davenport; F. B. Hudson, Omaha; J. E. Kuntz, Cedar Rapids, and D. D. Bentzinger, Burlington, will discuss the paper on "Transportation" by Maurice A. Welsh. The paper by H. J. Connell on the relation of the claim department to the other departments of a railway is to be discussed by W. P. Thomas, Omaha; J. E. Marcussen, Davenport, and Dan Finch, Des Moines. R. J. Smith's paper on "Laying and Maintaining Track" will be discussed by R. H. Findley, Omaha; T. E. Rust, Waterloo, and W. L. Wilson, Des Moines. The paper by Frank R. Grant on "Dipping and Baking Armatures" will be discussed by Tom Wood, Omaha; W. G. Lamb, Waterloo; C. M. Feist, Sioux City, and John Sutherland, Davenport. A discussion on the relative cost of maintaining one-man and two-man cars will be led off by John Sutherland, C. M. Feist, W. G. Lamb and Tom Wood. John Sutherland, Davenport, will act as chairman of the meeting.

Pacific Railway Club Active

THE Pacific Railway Club held its fifth annual electric railway night Thursday evening, Aug. 11. George H. Harris, assistant to the vice-president and general manager, San Francisco-Oakland Terminal Railways, who is the club's president, presided. There were over three hundred steam and electric road officials and employees present.

The following papers were read: "The Electric Suburban Railway," by E. E. Thornton, San Francisco-Oakland Terminal Railways; "The Possible Field for Trackless Trolleys," by A. V. Thompson, General Electric Company; "History and Comments on the Third Rail System," by C. E. Hatch, Northwestern Pacific Railroad.

Following the reading of these papers, the meeting adjourned to the Market Street Railway's new downtown substation, where an address was made by J. E. Woodbridge, resident engineer for Ford, Bacon & Davis, by whom the station was designed. Mr. Woodbridge explained the details of design and construction and also the method of operation. The station was placed in operation to illustrate this talk.

American Association News

Modification in Program

THE title of the paper to be presented by H. C. Hopson at the Tuesday morning meeting of the Accountants' Association has been changed from that given in the issue of Aug. 27 to "Adaptation of Routine Accounting Results to Particular Uses."

Leaflet on Des Moines

THE advertising department of the American Electric Railway Association has prepared a leaflet giving some facts with regard to the Des Moines situation, extracts from papers commenting on the bus service in that city, etc.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

City Takes Toronto Railway

Operation Assumed by New Transportation Commission, But Purchase Details Remain to Be Adjusted

Toronto has taken over the property of the Toronto Railway. The lines are being operated by the city in conjunction with the lines of the Toronto Civic Railway. The statement made previously in the ELECTRIC RAILWAY JOURNAL to the effect that the details of the negotiations would not be completed by Sept. 1 was correct, but it was decided to go ahead with the transfer of the road to the city at this time. It is anticipated that all the negotiations in connection with the purchase will be completed by Jan. 1 next and that the Toronto Railway will be liquidated before that time.

In view of the fact that the financial arrangements have not all been perfected, it was announced that payment of the principal on the balance of the outstanding 4½ per cent first mortgage bonds of the Toronto Railway, which fell due on Sept. 1, would have to be deferred until the company was in receipt of funds arising from the sale of its assets to the city and of its subsidiaries to the city and province. As a concession to the bondholders concerned, the directors announced that interest on the bonds would be paid as usual and that from the date of maturity until the date of payment of the principal of the bonds, the interest rate would be voluntarily increased from 4½ to 6 per cent. The bond issue was originally for $4,550,000. It was dated Sept. 1, 1892. Of the original sum $2,275,000 has been retired by the sinking fund, leaving a balance of the same amount. The statement to the bondholders said:

> The arbitration proceedings will of necessity occupy some weeks, and until the award is made, the company will not be entitled to payment for its property. It is, therefore, unable to provide the necessary funds for the redemption of its bonds on Aug. 31. The interest due on that date will be paid as usual.
>
> The bonds are of first charge on the undertaking of the company until taken over by the city and, therefore, upon the money payable by the city as compensation. The directors counsel the bondholders not to sacrifice their bonds, as they are amply secured and will be paid at their full face value.

H. H. Couzens, general manager of the Toronto Transportation Commission, has assumed the management of the properties taken over. One of the first acts of the city was to cancel after midnight on Aug. 31 all bus service licenses granted for use in the city by the Board of Police Commissioners. When bus owners operating services in the city were granted their licenses, they were notified that the right to operate would not be good after Sept. 1.

According to the Toronto *Globe* Sir William Mackenzie, president of the Toronto Railway, is credited with the statement that the stockholders of the railway were badly used. In commenting on this, the *Globe* said that there will be very general agreement with that statement, but there will be as general a dissent from Sir William's suggestion that the action of the city in any way prejudiced the interests of the shareholders. The *Globe* said in part:

> He, himself (Sir William), is chiefly responsible for the grievous losses that have fallen upon the investors who bought the Toronto Railway shares in boom years of 1911 and 1912 at prices ranging from $130 to $160 a share and who are now confronted with a stock market valuation around $70 for the same shares.
>
> If Sir William, looking back over thirty years of street railway direction and control in Toronto, can feel that he did the best he could, either for the citizens or the shareholders of the Toronto Railway, he must hold himself to a far less strict standard of conduct than he would exact from any of his subordinates. When he tells of how badly the shareholders have been treated, the answer of the citizens must be: "Thou art the man."

The *Globe* is further of the opinion that the citizens of Toronto "who enabled the company to pay dividends on $6,000,000 of watered stock as well as the charges on the borrowed capital invested in the enterprise, were compelled to use obsolete rolling stock dragged over worn-out rails." The *Globe* says that the extensions to which the people of Toronto believed themselves entitled under the franchise to the Toronto Railway were refused and that a system of civic railways had to be built by the city on the outskirts and operated at a loss, while the Toronto Railway fed fat on the highly profitable traffic of the central district.

While the city does not of course acquire title to the road until the award of the arbitrator has been received and the papers to the negotiations finally signed, the commission in charge of the property has gone ahead on the assumption that the road must be made to pay from the very start. As the result of its consideration of the whole problem, it was, therefore, decided that instead of the straight 5-cent fare the cash for adults should be 7 cents or four tickets for 25 cents and sixteen tickets for a dollar, or fifty tickets for $3. Night rates for all passengers will be 15 cents. As for children's fares, infants in arms are carried free, but for all others, irrespective of age, not exceeding 51 in. in height, the rate is 4 cents cash or seven tickets for 25 cents.

It is reported that the Mayor declared that he would not sign the documents necessary to the transfer of the property because of the 7-cent fare decision and issued instructions for the railway to be temporarily operated by the municipal officials at the old rate of fare, which averaged about 3½ cents, compared with the higher fare required by the commission to pay expenses.

Situation in Des Moines

No Agreement on Offer of Employees—City Files Answer to Foreclosure Proceedings

City officials and the railway failed to agree on union employees' proposal for resumption of service in Des Moines. Company officials declare that the men's plan does not give adequate financial guarantee, particularly to cover possible damages. W. E. King of Toltz, King & Bay, Minneapolis, was called into conference with Corporation Counsel Miller on Sept. 7 and it is reported that he will be employed by the city during the franchise negotiations.

Electric railway service in Des Moines was shut down again on Friday night, Sept. 2, after eight days' service during the period of the Iowa State Fair. Operation of cars during the period of the state fair showed sufficient receipts to cover operating expenses with no provision for interest and depreciation.

After a mass meeting of the railway men's union on Friday application was made to Judge Martin J. Wade, on behalf of the union, to order a resumption of service for a period of thirty days while the franchise negotiations are under way.

In their offer the union employees agree to guarantee expenses to the Des Moines City Railway during the trial period under an arrangement similar to that made by the State Fair Association.

This offer is that the revenue during the thirty-day period will be used to pay all expenses except those for labor, any balance of revenues to be prorated among them, but no allowance to be made for the payment of taxes, bond interest or depreciation charges during the period of thirty days. This arrangement is similar to the conditions laid down in the agreement with the State Fair officials for the resumption of street car service temporarily.

The text of the men's offer in part follows:

> Whereas, we, the employees of the Des Moines City Railway, members of Division No. 441, believe it to be to the best interests of the citizens of Des Moines to be provided with the best street car service possible, pending a final settlement of the differences between the city and company; and,
>
> Whereas, we have been informed that the company will discontinue service at midnight today unless it is guaranteed against loss; therefore, be it
>
> Resolved, that we, the members of Division 441, employees of the company, instruct our officers to notify the City Council and all others concerned that we will operate the cars for a period of thirty days and will agree to accept as wages, divided pro rata per hour, such amount as may be after paying actual operating expenses. Provided, however, that interest, taxes and depreciation shall not be considered as operating expenses during this period.

Corporation Counsel Miller announced on Sept. 3 that he would also make application to Judge Wade for a restoration of service on the offer made by the men. Judge Miller's statement came after a conference with F. C. Chambers, general manager of the Des Moines City Railway.

Saturday brought another development with the filing of the city's reply in federal court to the foreclosure complaint. The city maintains that the franchise under which the Des Moines City Railway has been operating is still in force and that the franchise is the only authority for the company to occupy the streets. Claim is made that suspension of service is a direct violation of the franchise and that occupation of the streets without operation of service constitutes an obstruction of the streets, and that if it continues "the city will deem it necessary to tear up the tracks, poles and wire and clear the city streets."

In the event that a sale of the property is made the city asks that it be made as soon as possible, and "that the property so sold be treated as a unit and subject to the ordinances preserving to the city the franchise intact." The city also points out that the purchaser at any sale takes the properties subject to the lien and franchise of the city. The reply is the first definite declaration of policy by the city during the controversy.

The franchise prepared by the Harris interests had not yet been returned on Sept. 31 to the City Council by Corporation Counsel Miller.

Upon complaint of the superintendent of schools that buses were failing to meet the situation and were keeping children from school, operators agreed to reduce the fares to 2½ cents for school children and to provide extra buses for certain schools.

P. R. T. Wage Cut Hinted

A wage cut affecting the employees of the Philadelphia (Pa.) Rapid Transit Company looms up as a possibility. Thomas E. Mitten, president of the company, said recently that the wage scale must continue to follow the average scale of Chicago, Cleveland, Detroit and Buffalo even if reductions result. Mr. Mitten's remarks were made at a picnic and dinner tendered to 500 officials and departmental heads of the Co-operative Welfare Association of the company. The affair was held at the Willow Grove Casino.

Mr. Mitten reviewed the important developments in the history of the company during the last eleven years, and said that Philadelphia had been transformed "from the worst-served city in 1910 to a service which compares favorably with that of any other city." Touching on keeping up with the four-city average Mr. Mitten said:

> No matter how much our inclination may run in the direction of retaining the present 65-cent wage as we had hoped, we must now, in fairness to the car rider and to the P. R. T. stockholders, be as exact in making reductions in accordance with the four-city average as we were in grabbing off the increase when the four-city average made that a fair thing for us to do.

Seattle Jitneys Must Go

The State Supreme Court on Sept. 2 denied the petition for a rehearing of a group of Seattle jitney drivers. This petition was recently filed by the H. P. McGlothern group of jitney drivers and a second group of drivers later intervened in the suit.

This decision upheld the order of the Superior Court and means the jitneys must leave the streets of Seattle. Their only recourse is to appeal to the United States Supreme Court where the chances for obtaining a review of the jitneurs' litigation against the city of Seattle is very remote, according to those familiar with the situation.

Milwaukee Company Inaugurates Limited Interurban Service

The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has announced a limited service from Milwaukee to Watertown, located about 50 miles away from Milwaukee, at the terminus of one of the company's interurban lines. The service will consist of two trains each way daily, except Sundays and holidays. In view of the lower fare on the electric railway as compared with the steam road rate for the same trip it is hoped materially to increase the company's interurban business on this particular line. At the same time announcement has been made of changes in the leaving time of interurban trains operating on some of the other interurban lines of the company to aid connections and to increase through traffic on the interurbans.

Beginning June 1, the company placed on sale new twenty-five-ride commutation tickets between Milwaukee and the more important stations on the interurban system at very attractive rates. These will be limited to the use of the purchaser and will be good for six months. There will also be on sale 500-mile mileage books at about 2¼ cents per mile plus 90 cents war tax, or at a total of $12.15. The mileage book will be transferable, good for one year from date of purchase and will permit of its being used by any number of persons at one time. On Sept. 1 the company will begin selling forty-four-ride commutation ticket books for the individual use of the school children.

The company's announcements of proposed changes in service and in ticket rates have been made through advertisements in the various local papers and through a small, attractive leaflet which will be distributed on the cars and at the various terminals. The leaflet contains a form for making suggestions for the betterment of the interurban service. The interurban rates of the company are 3 cents per mile cash, 2.75 cents per mile if single tickets are bought, 2.25 cents per mile when 500-mile mileage books are bought, 2 cents per mile with twenty-five-ride books and as low as 1½ cents per mile if fifty-two-ride non-transferable one-month books are bought. In connection with the inauguration of limited service, the company will also undertake to transport free of charge a certain amount of baggage.

New Orleans Council Approves Maloney Plan

The trolley troubles of New Orleans which have dragged settlement for these many months appear to have reached an end, in a plan of action proposed by Commissioner Paul Maloney of the Department of Public Utilities, at a special meeting of the Commission Council on Sept. 3.

The Maloney scheme, it may be stated, has received the indorsement of the civic, commercial and financial bodies of New Orleans and was approved at the meeting of the council by a vote of 4 to 1, Mayor McShane alone standing out against settling the controversy on a basis of $44,700,000, for making the rate of return, though not opposed to the Maloney estimate of $44,700,000, as the value of the property.

Neither Judge Foster of the Federal District Court, who will of necessity be required later on to pass upon the recommendations of Commissioner Maloney and the Commission Council, when the matter is brought to his attention officially, nor Receiver J. D. O'Keefe of the Public Utilities Company would comment upon the new plan of settlement. It is planned, however, to ask Special Master Chaffee of the Federal Court to postpone the hearing which was to have started on Sept. 6 for a period of three weeks, in order to give the security holders of the company time to assimilate the plan.

C. C. Chappelle, representing the New York Security Holders Committee, was the only voice raised in a criticism of the Maloney plan. He thought the restrictions and conditions imposed under the Maloney plan were unique in public utility financing and regulations, and that this departure from approved standards and principles might have the effect of preventing investors from financing the reorganization. He intends to return to New York immediately.

The city's ultimatum is as follows, briefly speaking:

Valuation, $44,766,000; rate of return, 7½ per cent. Immediately on reorganization and discharge of receivership, the rates and charges to be as follows, for a test period of six months:

Car fare, 7 cents with universal transfers; gas rate, $1.30 per 1,000 cubic feet; electric rates unchanged; the city to have a perpetual option on the following utilities of the company as of Dec. 31, 1920:

Gas plant, $8,652,000; Electric Light & Power Co., $10,048,000; Street Railway, $20,000,000. The company to be reorganized within a period of six months, the Commission Council to have one-third of the Board of Directors on the directory of the new organization, who shall be neither state nor city officials.

Interurbans Run in Albany

Amalgamated Requires Schenectady Railway Employees to Operate in Strike Zone

There is no change in the Albany-Troy-Rensselaer strike situation and the endurance contest between the United Traction Company and its former employees will apparently continue for some time yet, although it is generally conceded that the strike, as such, is over.

Interurban cars from Schenectady were run into the strike zone in Albany and Troy on September 1 for the first time since the strike was started in January, the cars so operating carrying no local passengers within the city.

The operation of interurban cars into the strike zone of Albany and Troy is the result of the order of the executive committee of the Amalgamated Association given out in Detroit on Aug. 31 to obey the request of the Schenectady Railway and the Hudson Valley Railway to run into the strike zone.

Politics, both big and small, is being played with the traction situation. In Schenectady George R. Lunn expects to win for mayor on the Democratic ticket this fall and next fall become the logical Democratic candidate for Governor on the strength of having averted a strike of railway men in Schenectady and the cities west of Albany. In Albany Patrick E. McCabe, former Tammany boss of Albany County, is running on an independent platform for Mayor, declaring for a 5-cent fare and the eternal damnation of the United Traction Company.

JITNEY SITUATION IN COURTS

The attitude of the United Traction Company is that the strike is over. The officers of the company expect that the fall and winter months will bring a return of most of the former patrons, who are now walking or jitney riding.

The entire jitney situation is now in the Supreme Court before Justice Harold L. Hinman. It is generally conceded that the New York State statutes and constitution afford a wider protection to interests holding transportation franchises as against competitive transportation systems than do the statutes of some other states, and that in all probability the proceedings now pending before Judge Hinman will result in a set-back to all jitney operations in the State, unless the Legislature should by chance intervene, a proceeding which appears very unlikely.

After reciting circumstances and conditions in the three cities, the decision of the Amalgamated read in part:

> The feeling of your general executive board is that the order is put up to the association for the purpose of placing us in an embarrassing position with no alternative except to violate the principles of collective contract.
>
> Now, therefore, your board lays down to you as the establishing of a decision upon the question, a rule to be followed: That you live up to your contract and operate your cars into the terminals of Albany and Troy, with the direct understanding that you are to carry the regular passengers of your own roads in and out of those cities in a manner that, in fully conserving your agreement relations, you will do nothing detrimental to your fellow workers that are waging a struggle for the right of organization in those cities. You are hereby instructed to carry out this rule.
>
> Every means available within this association will be used to assist the men of Albany and Troy now engaged in fighting the lockout, and at least $7,000 a week will be placed behind these men until the convention of the association can act upon the matter.
>
> In addition to this, officers of the international asociation will be sent to our various local divisions, to explain to them that the rumors that are being spread that the lockout is lost and that the amalgamated is not behind the Albany and Troy members of this association, are absolutely untrue, and to appeal to the membership of those local divisions, that each of these locals pledge, through their membership, financial aid and assistance in addition to what the convention may do for them.
>
> We will place this situation before the representatives of the various political parties of the state of New York and lodge with state, city and county officials an appeal that they give their assistance and exercise their good offices to bring about an honorable settlement of the lockout situation in Albany and Troy, on the ground that the company is operating under concession and solely by the right of franchise of the people, and that the people's rights should and must be respected and served by them.

Birmingham Files Injunction

Following Appeal From Decision of Commission the City Files Injunction Proceedings

Injunction proceedings have been filed by the city of Birmingham against Lee C. Bradley, as receiver, and the Birmingham Railway, Light & Power Company, in the Chancery Division of the Circuit Court, attacking the constitutionality of the Alabama public utilities act. The city, by these proceedings, seeks to restrain the receiver and the Birmingham Railway, Light & Power Company from collecting the 8-cent fares and the 2-cent transfer charge put into effect weeks ago by the Public Service Commission.

The court is asked in the proceedings to declare the franchises of the company forfeited for alleged violations of the contracts between the city and the company, and to enjoin the collection of any fare in excess of the sum of 5 cents, which is provided in the old contract between the city and the company.

Vigorous attack on the constitutionality of the public utilities bill, which gives the Alabama Public Service Commission exclusive right to regulate the rates charged by public utilities in the State, is made in the suit. It is charged that the Birmingham Railway, Light & Power Company was largely responsible for the adoption of the bill.

The case has not yet been set for hearing. Under the law the receiver and the company have thirty days in which to answer the proceedings. When the answers have been filed the case will be set down for hearing.

The time for appeal from the decision of the Alabama Public Service Commission granting the 8-cent fare has not yet been announced. This appeal was filed in the Circuit Court of Montgomery County. Under the provisions of the public utilities act, an appeal from one of the decisions of the Public Service Commission can only be filed in the Circuit Court.

Toledo Prospect Better

First Year's Operation at Service-at-Cost May See Deficit Wiped Out and System Stabilized

There will be no electric railway extensions in Toledo, Ohio, for at least a year. This announcement has been made by Street Railway Commissioner Wilfred E. Cann. It is believed, however, that the completion of the first year's operation under the service-at-cost plan will see the deficit largely wiped away and the system in a fair way to reduce fares and greatly better operation.

During the present summer 40 per cent more repair work and track improvement have been undertaken than in the last three years. Many downtown intersections have been repaired and replacements have been made in some long stretches of track. Commissioner Cann said:

> While car riding continues to fall off—there were 55,000 fewer passengers carried in the first twenty-five days of August than in the same number of days in July—we have been able to stem the deficit.
>
> I thought 10 cents a car-mile for maintenance would be none too much when I came here. That ratio has been turning in $58,000 to $60,000 a month to the maintenance fund. That figure has been cut down because we weren't spending the money that fast.
>
> We have been able to economize through the elimination of the Huron line, speeding up service, cutting out surplus employees, doing away with dead car mileage, and splitting lines in the downtown district. I believe that by Oct. 1 we will have cash in all the funds up to their limit and then we can start putting money back into the stabilizing fund.

AUGUST STATEMENT AWAITED WITH INTEREST

The stabilizing fund now stands at $140,000. It must come up to $500,000 before the reduction of fares is possible.

It is believed the statement of operations for August, to be presented to the board of control at its meeting on Sept. 12, will be the best yet brought out by the commissioner. Fare raises have changed the complexion of operations.

The Toledo Railways & Light Company has made arrangements for the lifting of the $12,000,000 mortgage against its properties. This indenture also binds the holdings of the Community Traction Company. It was agreed at the time of the transfer of the property that a large cash forfeit would be made by the Doherty companies if the mortgage was not lifted by December.

Morton Seeley, attorney for the Toledo Railways and Light Company has been in New York, arranging for the new financing of the local properties.

Third Wage Cut in Effect

Trainmen of the McKeesport branch West Penn Railways, Pittsburgh, Pa., have been notified of a wage reduction amounting to 5 cents an hour. Motormen and conductors will now receive 48 cents an hour for the first three months of service, 53 cents for the next nine months, and 55 cents for all time after a year's service. This is the third reduction in effect since May.

Suburban Men Cut 15 per Cent

A wage cut of 15 per cent, retroactive to July 1, has been announced by the arbitration board in the case of the Middlesex & Boston Street Railway, Newtonville, Mass. This award will make the wages of blue-uniform men for the ensuing year as follows: First three months, 42½ cents; next nine months, 47 cents; thereafter, 51 cents an hour. This compares with 50 cents, 55 cents and 60 cents an hour under the heretofore existing scale. The award was accepted by the union.

Owing to the retroactive feature of the award, the employees will be obliged to refund to the company the excess wages received under the old scale since July 1. Negotiations were commenced prior to that time, but were not completed until recently, so the company continued to pay the old scale with the understanding that the employees would refund any difference which might exist when the arbitrators finally settled the new rate.

The arbitration board consisted of Colonel Charles R. Gow, Pitt Drew and James H. Vahey. Messrs. Gow and Drew formulated the majority report, which fixed the new scale. Mr. Vahey presented a minority report dissenting from the award.

The majority members accepted the company's contention that the existing high wage scales were the result of a series of upward boosts in rates which were in every case intended to enable the employees to meet the increased cost of living. This cost has now receded materially, according to the report, and therefore a downward revision of wages is justified.

In his dissenting opinion, Mr. Vahey maintained that the rates fixed are entirely inadequate, and claims that the majority finding was based on the law of supply and demand for labor, that is, on the ability of the company to employ men at lower wages because of the present widespread conditions of unemployment. Mr. Vahey said:

> When employees agree not to strike, when they surrender this industrial weapon, and when they agree with the employers to submit their question of wage rates to a board of arbitration, both sides are thereby precluded from invoking the law of supply and demand.
>
> And yet the majority of the board allows the wage rates to be fixed by the hunger of unfortunates who are at present out of a job.

Trolley Crashes Into Hotel

An electric train consisting of three freight cars en route from Worcester to Springfield, Mass., on Aug. 31 jumped the track on the incline of State Street, Springfield, and crashed into a stone and brick building occupied principally by the Victoria Hotel. The impact tore away the supporting pillars and the falling walls exposed the sleeping rooms on the upper floors.

The express messenger in one of the cars was the only person who received serious injuries. The motorman was only slightly hurt, but a hotel guest was severely cut. The damage to the building is estimated at $50,000. Two of the express cars were destroyed and the other is almost a total loss. Manager Flanders of the Springfield Street Railway began an investigation at once. He himself is of the opinion that slippery rails was the cause of the accident.

Railway Doing Its Best

Company at Portland, Ore., Is Putting Money Back Steadily Into Its Properties

In a petition to the Public Service Commission of Oregon the City Council of Portland, through City Attorney Grant, urges that the Portland Railway, Light & Power Company be required to perform certain maintenance and construction work on railway lines in Portland or reduce the fares on such lines.

The city, in its petition, maintains that the company has failed entirely to do extra maintenance work, and has also failed to do a large part of reconstruction work, all of which was set up by the company as one of the reasons necessary for an increased fare granted on June 20, 1920, by the Public Service Commission.

Franklin T. Griffith, president of the company, denies the allegations of the City Council, asserting that not only has the company carried out its obligations, but in addition it is the only employer of large numbers of men in the State of Oregon that has a greater force at work than is shown in the records one year ago.

In its petition to the Public Service Commission, the city contends that when the railway requested an increase from a 6-cent to an 8-cent fare, representation was made that the additional revenue was required to perform reconstruction work estimated to cost $656,900; also that for a period of twelve months following the allowance for increased fare, it would be necessary to spend $10,000 a month for maintenance work which had been deferred because of lack of funds. The city alleges that the company has failed to perform the extra maintenance work, and has also failed, neglected and refused to do a large part of the reconstruction work.

President Griffith stated that during the period from July 1, 1920, to July 31, 1921, the company actually expended on maintenance and reconstruction of its railway system a total of $869.389, and that the number of reconstruction jobs under way will require an additional $193,782 to complete. This is exclusive of the increased maintenance program. Mr. Griffith said:

> It is true that prior to the inauguration of the 8-cent fare, the railway was unable to expend the sums of money necessary for proper and complete maintenance. The 8-cent fare materially helped the situation, but the 8-cent fare was calculated to provide a sufficient revenue for normal maintenance and operation, and was not intended to and has not provided any surplus revenues to care for deferred maintenance or reconstruction.
>
> As a matter of fact under present reduced railway earnings, the 8-cent fare is insufficient to provide for normal maintenance and operation, and a reasonable return upon the value of the property. This condition is due to the widespread unemployment in Portland, which is reflected in a reduction of railway patronage, which will doubtless continue until there is a general improvement in business conditions.

Wages Reduced on Market Street Railway, San Francisco

The wages of all platform men in the employ of the Market Street Railway, San Francisco, Cal., were reduced 4 cents an hour beginning Sept. 4, and a new wage scale was put into effect for all men employed after that date.

During the period of rising prices from 1917 to 1920 the company advanced the wages of its platform men from a maximum of 33 cents an hour and a minimum of 25 cents to a maximum of 56 cents an hour and a minimum of 50 cents. The average wage in 1917 was 30 cents an hour; in 1920 and today the average is 54 cents.

William von Phul, president and general manager of the company, in addressing the men, said:

> Based on the reports of the United States Department of Labor prepared for the San Francisco and Oakland Districts, the cost of living reached its maximum in June, 1920. Since that time and up to June, 1921, the Department of Labor reports a decrease in all items of expenditure constituting the average budget of 20.14 per cent. The department similarly reports a decrease of 13.10 per cent in all items of expenditure for June, 1921, as compared with December, 1919.
>
> During the period preceding the reorganization of the United Railroads, San Francisco, the property was operated not only without any return to its owners, but interest on the $23,500,000 of 4 per cent sinking fund gold bonds of the then operating company was not paid and no dividends have been paid on the stocks of the new Company.
>
> For the last few months the earnings of the company have fallen off on account of the reduction in receipts and it is necessary that expenses be reduced.
>
> For these reasons, effective on Sept. 4, 1921, there will be a reduction of 4 cents an hour in the wages of all platform men now in the service of the company. The 2-cent-an-hour increase effective after each six months of the first year of employment and a final increase of 2 cents up to a maximum of 52 cents an hour after a further period of one year will still apply to all platform men in the service on Aug. 30, 1921.
>
> In addition to the above modification of the wages of present employees, a new scale will become effective, applying only to men employed on and after Aug. 31, 1921, providing an additional period of six months, which does not apply to present employees. The new scale in cents per hour will be as follows:

First Six Months	42c.
Second Six Months	46c.
Third Six Months	48c.
Next Twelve Months	50c.
Thereafter	52c.

> The management realizes the service rendered by the platform men and has been reluctant to make any change in the wage scale, but does so with the knowledge that the employees of the company realize the situation and will continue to render the same co-operation which they have in the past.

Wage Hearing Set

The arbitration board is now ready to settle the dispute between the employees and officials of the Schenectady (N. Y.) Railway. J. Teller Schoolcraft was recently selected third member of the board, the two others being Talmadge C. Cherry, representing the company, and Lawrence E. Gerrity, representing the union.

All meetings will be held in the county court house. They will be started at once. Prior to June 1 the men were receiving 60 cents an hour. The wages on that day were cut 25 per cent. If the board awards anything over 45 cents, that amount will be retroactive from June 1.

Financial and Corporate

Interborough Optimistic

Security Holders Renew Notes in Order to Prevent Appointment of Receiver

It was announced on Sept. 6 at the offices of J. P. Morgan & Co., financial agents for the Interborough Rapid Transit Company, that the renewals on the $38,144,400 worth of three-year 7 per cent gold bonds to next Sept. 1 had reached $33,000,000. This leaves about $5,144,400 in renewals to come in before the hearing on Sept. 9.

It was pointed out that the total of $33,000,000 represented only the actual amount of notes already deposited for renewal, and that notifications of intention to renew had been received from holders of several hundred thousand dollars of additional notes. Many of the holders have been on their vacations and were able to send only notices, and hundreds of the Interborough's letters requesting renewals have been returned because of changes of address and other postal difficulties. The holders are scattered through forty-six States and seventeen foreign countries.

On their success in obtaining renewals on these notes at 8 per cent, so that the principal of $38,144,400 would not have to be paid until next year, the officials of the Interborough base their hope of averting the receivership, because they are able to meet their current bills or obtain the "indulgence of creditors." The large total of renewals has increased the hope that the Interborough counsel on Friday will be able to tell Judge Mayer that the company will fight the application of President Clarence H. Venner of the Continental Securities Company for the appointment of a receiver.

COURT OPPOSES RECEIVERSHIPS FOR CORPORATIONS

As indicated briefly in the account of the Interborough receivership proceedings which appeared in the ELECTRIC RAILWAY JOURNAL for Sept. 3, page 376, Judge Mayer left the matter open, at least until Sept. 9. The court clearly intimated that he was opposed to any more receiverships, especially of large corporations, if there was any way of avoiding them. In setting the day for further argument Judge Mayer said:

> Both in public interest, and in the interest of security holders, there should be no receivership for this company if it can possibly be prevented. These are tender times, and many complications might arise in case of the receivership for this corporation, which would have a drastic effect upon the convenience and the comfort of a large community. I realize that the arguments this morning, are upon the matter of adjourning the appointment of a receiver. As to the actual merits of the original motion, to appoint a receiver on the bill of complaint, the court will take up that matter on its merits later. I shall adjourn this motion until Friday of next week, or September 9, upon express condition that counsel get together and see if some arrangement cannot be made by which this proceeding can be obviated.
>
> If, however, this cannot be done, counsel may feel free to come to me any time on proper notice to the court and other counsel for such action as may be deemed fit. I take this stand in view of the fact that the company has but $1,365,000 of current bills which have been running for only three or four months, and also in view of the overwhelming majority of the noteholders who have consented to an extension of time for the three-year 7 per cent notes.

At the hearing before the court on Sept. 1 James L. Quackenbush, counsel for the railway, asked the court to dismiss the application for receivership. This Judge Mayer refused to grant, stating that the case was ready for argument and it must go ahead. In his argument against the appointment, Mr. Quackenbush told the court that the Interborough had in round figures $35,000,000 in stock, $160,000,000 first mortgage 5 per cent bonds and $40,000,000 of 7 per cent notes, the proceeds of the bonds and notes having been sold for the construction of subways for public service. It was only the credit of the Interborough heretofore, he said, that made possible the construction of the subway system in New York. It has grown to be indispensable to the public. He reminded the court that the total claims against the Interborough, including current obligations, amounted to only $1,365,000, or less than ten days' receipts. The tort claims against the company he said amounted to less than $100,000. Mr. Quackenbush said:

> We have never defaulted on a single obligation we ever contracted for. It is true that we have been slow paying for the past two years, but in spite of adverse conditions we had to meet we have paid, and I would remind those who are assailing our credit that we are still the largest taxpayers in New York City. I admit the charge made against the company that it exhausted its credit three years ago, through circumstances that it could not control, and was obliged to issue these notes which do not become due until the end of this day.
>
> We have at this moment more than 76 per cent or over $29,000,000 of the outstanding notes deposited, and it is my firm belief before the day is over we will have most of the 24 per cent still outstanding. If a receivership should be precipitated at this moment, I do not know when the Interborough may ever again be able to go before the public for the purpose of procuring the necessary means to give them the conveniences in the way of transportation that they need.
>
> In so far as this action is concerned, or in the alleged claims which it asserts the Interborough is not able to pay, I can only point to its financial solvency by the way of statements open to the public. However, the time may come when I may have to come before this court and either consent to such an application as has been made or to ask myself that a receiver be appointed.

In view of the opinion of the court and the hearty response of the security holders to the request of the Interborough that they renew their notes, the officials of the company feel hopeful that a receivership can be avoided. It is hoped to have all the notes renewed before the hearing on Sept. 9 and that arrangements can be made for satisfying current claims against the company.

$10,000,000 Increase in Ohio Valuations

Tax valuations of Ohio street, suburban and interurban railroads have been boosted $10,119,330 over the 1920 valuations, according to the 1921 figures announced on Aug. 26 by the State Tax Commission.

The total valuations of properties of eighty-two companies are placed at $197,874,300. The 1920 total was $187,754,970.

The valuations of sixteen companies were decreased this year, twenty-three were left the same as last year, and increases were made in forty-three instances.

Included in the new valuations were the following:

Ohio Electric Railway, $10,622,980; last year, $11,672,440; decrease, $1,049,460.

Toledo Railways & Light Company, $14,137,460; last year, $13,718,360; increase, $419,100.

Cleveland Railways, $32,696,760; last year, $29,243,960; increase, $3,352,800.

Cleveland, Southwestern & Columbus Railway, $4,651,260; last year, $4,734,980.

Cleveland, Painesville & Eastern Railway, $2,181,950; last year, $1,916,540.

Cincinnati Street Railway, $21,194,960; last year, $20,716,930; increase, $478,030.

Cincinnati & Dayton Traction Co., $1,736,380; last year, $1,637,720.

Northern Ohio Traction & Light Company, $24,777,930; last year, $22,642,470; increase, $2,133,460.

Ohio Traction Company, operating Cincinnati & Hamilton Traction, $2,457,600; last year, $838,270; increase, $1,619,330.

Scioto Valley Traction Company, $2,301,470; last year, $2,362,170.

Lake Shore Electric Railroad, $5,114,390; last year, $4,988,240.

Columbus Railway, Power & Light Company, $17,825,190; last year, $17,097,520.

Cities Oppose Indiana Utility Merger

The petition of the Indiana Electric Corporation to issue securities for the purchase of seven Indiana utilities, which has been the subject of an extended hearing before the Public Service Commission, was discussed on Sept. 2 at a conference attended by Governor McCray and members of the commission. Governor McCray, following the conference, said the matter is entirely in the hands of the commission and that he has complete confidence in its ability to reach a fair decision.

In answer to the charge that the corporation would not be able to meet its fixed charges, counsel for the corporation filed a memorandum with the commission showing an estimated annual increase of surplus after payment of all charges, including depreciation. "Any computations of earnings based on conditions now existing and likely to prevail in the future," said the memorandum, "and with proper deduction for depreciation and other charges will show net earnings ample to meet all proposed fixed charges of the petitioner."

Harry O. Garman, engineer for the commission, has testified that the value of properties which the corporation proposed to acquire and merge is $10,284,361, or slightly more than half of the value ascribed to the properties by attorneys for the corporation. Mr. Garman was called as a witness at the request of attorneys for cities and interests opposing the issuance of $21,000,000 of securities, which, they say, is in excess of the value of the property.

Witnesses for the corporation contend that the value of the property is approximately $19,000,000, and its attorneys are asking the commission to allow them to issue securities to the amount of $21,000,000, the margin being intended to cover the loss entailed by selling the securities at a discount. Mr. Garman placed the reproduction cost of the companies at $12,180,443. He said that the difference between the present value and the reproduction figures is due to depreciation.

Start of Akron Appraisal Delayed

The plan of bringing A. S. Richey of the Worcester Polytechnic Institute at Worcester, Mass., to Akron by the city for the purpose of making a valuation of the Akron city lines of the Northern Ohio Traction & Light Company has been delayed for the reason that there is an insufficient sum in the city's public utility fund to pay Mr. Richey for his services. The city's legal department has held that the ordinance hiring Mr. Richey could not become effective until the necessary funds are in the treasury.

Mayor Carl Beck announces, however, that an effort is now under way to devise a plan to have a valuation of the property taken before Jan. 1, 1922. It is expected this plan will come before the Council at an early meeting. Mayor Beck announces that the appraisal should be taken with as little delay as possible for the reason that such action will tend to hasten the solution of the local traction problem. The Mayor points out that railway service in the city cannot be materially improved and developed until the proposed new franchise becomes effective. He adds that by delaying the taking of the appraisal until after the first of the year the passage of the franchise would be delayed about four months.

Negotiations between the city and the company looking toward a satisfactory solution of a method whereby the valuation may be taken immediately, despite the fact that there are no funds in the treasury for this purpose, are progressing satisfactorily and it is probable that an adjustment will be reached at an early date.

Electric Railway Service Suspended

Manistee, Mich., is without electric railway service as the result of the action of the Consumers Power Company, owner of the lines, in putting the cars in the carhouses at midnight on Sept. 1. Since that time this city has been without electric railway service.

Jitneys have been pressed into service to serve the outlying factories and the suburbs of Filer City, Oak Hill and Maxwelltown. The motor buses which have been in service this summer between this city and the summer resorts at Orchard Beach will be brought into the city and used on the streets formerly used by the car lines.

Manager C. S. Kressler of the Manistee Railway gave the following explanation of the situation:

> We haven't any money to operate cars longer, and as there is no prospect of obtaining relief we had no alternative but to suspend service.
>
> I had hopes that enough factory managers would be present at the commission meeting to bring pressure to bear that would have saved the service. But the little interest shown convinced me that they did not care what course we took.
>
> I still have hopes that street car service can be resumed in the near future. If we are permitted to lie idle, in the meantime, this will be possible, but if an attempt is made to force operation it will be necessary for the company to go into the hands of receivers, and probably complete bankruptcy, which means that the rolling equipment will be disposed of and the tracks torn up.

Small Surplus Earned by Sacramento Northern Railroad

According to the annual report of the Sacramento Northern Railroad of California for 1920, the company earned about $30,000 in excess of the interest on its bonded debt, although the accompanying statements show a deficit. This is due to the fact that a deduction of $50,241 is included under the item "Deductions" for "amortization of discount on funded debt."

Altogether, the company did not make a very bad showing, operating as it did under handicaps and in a year when many roads found it difficult to make both ends meet. Railway operating expenses increased about $240,000 over the previous year. The item of bond interest also increased due to the fact that interest on the "B" issue did not become a fixed charge until July 1, 1919.

The income account for the year 1920 compared with 1919 is shown in the appended statement.

INCOME ACCOUNT — SACRAMENTO NORTHERN RAILROAD

	1920			
	Actual	Per Cent of Operating Revenue	1919	Per Cent Change Over 1919
Operating revenue	$1,648,017	100.00	$1,506,734	9.3
Operating expenses	1,266,463	76.80	....	....
Depreciation	184,219	11.28	....	....
Total operating expenses	$1,450,682	88.08	$1,210,767	19.8
Net revenue—Railway operations	197,335	11.95	295,967	**33.3**
Auxiliary operations, net	14,681	0.89	12,244	20.0
Net operating revenue	$212,016	12.84	$308,211	**31.3**
Taxes—Railway operation	73,571	4.47	61,531	19.6
Operating income	$138,445	8.37	$246,680	**43.8**
Non-operating income	32,414	1.96	29,980	8.1
Gross income	$170,859	10.33	$276,660	**38.4**
Interest on funded debt	140,126	8.51	117,610	19.0
Interest on unfunded debt	1,612	.09	52,218	1.2
Amortization of discount on funded debt	50,241	3.04		
Miscellaneous debits	1,047	.06		
Total deductions	$193,026	11.70	$169,828	14.8
Net corporate income	( ) **22,167**	**1.37**	106,832	**110.5**
Road and equipment account	$9,932,572	......	$9,651,320	2.92
Miscellaneous physical property	203,167	......	154,904	13.1
Total	$10,135,739	......	$9,805,224	3.0
Capital stock	$4,480,598	......	4,469,023	.....
Funded debt	5,222,866	......	5,225,360	.....
Total securities outstanding	$9,703,464	......	$9,694,383	.....

(*a*) This was offset by the current profit and loss balance, leaving a net profit balance of $2,334, which amount was applied to amortize a like amount of the balance of $39,715 reorganization expenses.

Figures in boldface indicate decrease.

B. R. T. Assures Employees Against Loss of Thrift Accounts

Considerable concern has been caused to many employees in the metropolitan district through the recent taking over of the affairs of the National Thrift Bond Corporation, New York City, by the banking department of the State of New York. Among the employees who invested with the company were a considerable number of men and women in the service of the Brooklyn Rapid Transit Company, but the total of their subscriptions is understood not to have been large. Lindley M. Garrison, receiver of the railway, with the approval of the court, has determined to protect against loss employees who have subscribed to the bonds. As soon as the details have been worked out the management will arrange to take over the thrift receipts, etc., so the employees will receive the money which they invested.

The plan under which the Thrift Corporation worked was sound in theory, but the depreciation in security values proved its undoing. The company invested in Liberty Bonds and the securities of political subdivisions, depositing its purchases with the Equitable Trust Company as trustee and issuing its own participating certificates in $10 denominations against the bonds pledged as collateral. It is confidently expected that the company will eventually pay dollar for dollar, but it is of course very uncertain how long it may be before the company can dispose of the collateral without suffering a loss.

By the very liberal offer of that company the employees of the Brooklyn Rapid Transit Company are assured of the return at an early date of all of their money.

Zurich Abandons Zones

Commutation Tickets Popular When Short Ride Fares Are Withdrawn —Deficit at End of Year

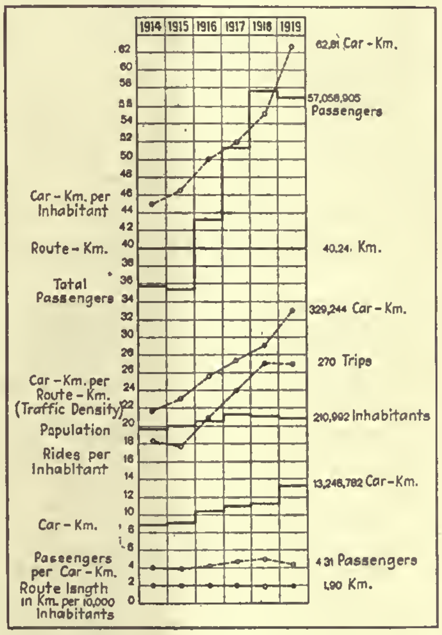
The report of the Zurich Municipal Street Railways for the calendar year 1919 indicates that the transport system serving the chief industrial city of Switzerland has been hampered by war and post-war conditions from enjoying extensions that, in at least one instance, were approved as early as 1913. Seven other extensions were approved but funds were voted only for one during 1919. This left the total number of route miles at 23.7 (38.3 km.) or 1.1 miles (1.8 km.) per 10,000 inhabitants. The total number of single-track miles was 53.1 (85.6 km.).

Rails were renewed on several routes and rehabilitated on one. The addition of an electric track switch raised the number of these automatic devices to thirty-five. In carhouse rehabilitation, for the first time in the history of the undertaking wooden instead of metal rolling doors were used. The rolling stock was increased from 224 to 231 motor cars and from 63 to 82 trailers. Energy consumption averaged 1.49 kw-hours per car-mile, a car-mile in this case being figured with motor-car miles as unity and trailer-car miles as one-half the energy consumption.

The total number of car-miles operated was 8,214,245 (13,248,782 car-km.) of which 1,846,336 car-miles (2,977,962 car-km.) were trailer miles. One route is always operated with trailers. The increase in service was 13.51 per cent, despite which the number of passengers fell 1.2 per cent (from 57,753,813 to 57,058,905) and the density from 7.8 to 6.7 passengers per car-mile. Rides per inhabitant per annum dropped from 272 to 270. Because of a 100 per cent increase in fare to the most numerous riders, as hereinafter detailed, the revenue per passenger rose from 11.74 rappen to 17.96 rappen. The earnings per car-mile increased 33.11 per cent or from 58.1 to 77.3 rappen per car-km. At the pre-war rate of exchange (100 rappen = 1 franc = 19.3 cents) the gross receipts per car-mile work out as 17.9 cents in 1918 and 23.9 cents in 1919. The total revenue increased from 6,781,355 francs to 10,246,629 francs ($1,308,793 to $1,977,599) or 50.69 per cent while operating expenses jumped 50.44 per cent to 10,186,867 francs or $1,966,065.

The net result for the year 1919, making allowance for renewals, reserves and 4⅘ per cent return on investment was a deficit of 1,259,111 francs or $243,008 while the total deficit including losses in 1914 and 1915 was 2,842,256 francs or $548,555.

An analysis of the accompanying table of fares paid shows that 55.3 per cent of the trips were made on the 20 rappen (say 4 cents nominally) fare whereas in the preceding year, when the zone system was used, 23.9 per cent of the one-ride passengers had enjoyed a 10-rappen and 12 per cent of the one-ride passengers a 15-rappen fare. The rest of the rides were divided among a variety of subscribers, including 14.8 per cent of any-hour riders, 10.2 per cent of mid-day and evening riders and 4.4 per cent of early morning riders. The abolition of 10 and 15-rappen fares led to a great increase in the sale of workmen's early hour and of off-peak (noon and night) tickets. The workmen's ticket which may be presented by anybody up to 7:45 p.m., is sold on a thirty-one-ride basis and costs but 10 rappen per ride if every trip is used. The off-peak ticket cover twenty-one rides and averages 14.2 rappen per trip if completely used. It is therefore possible for the thrifty Switzer to get his early morning ride for 10 rappen and his luncheon round trip and return home at night for 14.2 rappen per ride. The practical effect of these rates is to favor the regular short ride customer as long riders naturally have less time to ride home for lunch.



GRAPHS OF CITY TRAFFIC

STATISTICS OF ZURICH TRAMWAYS FOR 1918 AND 1919

Character of Fare			Number of Trips 1918 Total	Number of Trips 1919 Total	1918 Per Cent	1919 Per Cent	Per Cent of (Income) 1918	Per Cent of (Income) 1919
Single ride tickets....	1918	1919						
at................	10 Rp.	......	13,972,820	....	23.91	......	20.45	......
at................	15 Rp.	......	7,029,053	....	12.03	......	15.43	......
at................	20 Rp.	20 Rp.	4,519,609	31,692,299	7.73	55.34	13.23	61.80
			25,521,482	31,692,299	43.67	55.34	49.12	61.80
Commutation tickets:	Number of Tickets 1918	Number of Tickets 1919						
General............	901,928	528,545	17,951,228	8,456,720	30.73	14.77	33.16	15.46
Suburban...........	125,669	......	3,141,725	....	5.37	......	4.14	......
Off peak...........	7,365	277,690	154,665	5,831,490	0.26	10.19	0.33	8.12
Early a.m..........	41,235	84,234	2,004,070	2,527,020	3.43	4.41	1.82	2.46
Three months.......	18,133	......	6,527,880	....	11.18	......	7.95	......
To Höngg..........	......	33,815	....	4,064,160	......	7.11	......	6.02
Six months.........	3,457	4,443	2,489,040	3,198,960	4.26	5.59	3.03	4.55
One year...........	......	534	....	768,960	......	1.35	......	1.07
School tickets......	911	1,015	130,326	156,772	0.22	0.27	0.05	0.06
Interline A.........	138	283	2,760	5,660	......	......	......	......
Interline B.........	248	415	4,960	8,300	0.01	0.01	0.01	0.01
Telegraph, telephone and mail employees.	......	......	508,550	555,521	0.87	0.96	0.39	0.45
Total gross..........			58,436,686	57,265,862	100.00	100.00	100.00	100.00
Refund for unused tickets..........			682,873	206,957	......	......	......	......
Total net..........			57,753,813	57,058,905				

$2,900,636 Net Reported by Municipal Railway

Comparative receipts of the San Francisco (Cal.) Municipal Railway for the fiscal year 1919-1920 and 1920-1921 were reported in the San Francisco *Municipal Record* for July 28. The statement follows:

Line	1919–1920 Receipts	1920–1921 Receipts	Increase or Decrease of 1920–1921 Over 1919–1920
A (Park)........	$308,237	$321,825	$13,580
B (Beach).......	397,585	422,418	24,834
C (California St.)	333,639	352,001	18,362
D (Presidio).....	308,981	303,722	*5,259
E (Union St.)...	243,261	241,002	*2,261
F (Stockton St.).	168,306	181,923	13,618
H (Van Ness Ave.)	209,708	223,190	13,481
J (Church St.)..	359,819	393,948	34,129
K (Tunnel)......	321,089	368,928	47,838
L (Taraval St.)..	8,897	10,056	1,159
Bus No. 1.......	14,982	16,380	1,397
Bus No. 2.......	7,693	9,433	1,739
Total 5c. fares..	$2,682,197	$2,844,825	$162,627
School tickets....	17,699	19,763	2,063
Q. M. tickets....	3,928	3,551	*376
Special cars......	241	337	96
Cond. shorts.....	525	493	*30
U. R.R. transfers.	4,708	....	*4,708
Miscellaneous....	40,353	31,667	*8,686
Total receipts..	$2,749,651	$2,900,636	$150,985
Deduct U. R.R. transfers issued	6,235	....	....
Deduct insurance on auto busses..	14,400	....	....
Net receipts.	$2,729,015	$2,900,636	$171,620

* Denotes decrease.

Montreal Tramways Does Better

The Montreal Tramways Commission has issued the annual statement of the year's operation of the Montreal Tramways to June 30 last. It shows gross receipts for the year amounting to $11,773,005, as compared with $10,782,470 in the preceding year.

Operating expenses were higher in the year, being up about $500,000 to $6,327,841. This left operating profit at $47,442, up from $46,606 the previous year. Maintenance and renewals are up some $400,000, to $2,529,055. Surplus balance is given at $378,708, against $243,124 the previous year, after taking into consideration allowances due the company.

City rental of $500,000 and contingent reserve, both payable when earned, reduce the showing, making a deficit on the year of $239,022, against $364,700 the previous year.

Trade Body Committee Opposed to Reorganization Plan

Reorganization of the Pittsburgh (Pa.) Railways with "one owner, one franchise, one debt and one operator" is urged in a report submitted by the joint committee on better street car service of the Allied Boards of Trade and adopted by the boards' executive committee. The report contains nineteen objections to the reorganization plan already proposed and submitted to Council for approval. The report will be submitted to constituent bodies of the Allied Boards of Trade for their individual action before being formally taken before Council.

The report contends that, in the reorganization, all leases of underlying companies should be surrendered for cancellation on the grounds that they have previously been the largest factor in preventing successful operation of the company. It holds that the valuation of $62,500,000 is excessive and that this figure was reached by the Public Service Commission, using wartime prices as a basis of calculation.

One clause of the report urges that an agreement for an indefinite franchise be reached and that the city refrain from tying its hands on the terms of the proposed franchise agreement. It also urges that the city reserve the right to purchase the entire system at any time at a price not to exceed the Public Service Commission's valuation. It holds the agreement should stipulate for no collection of increased fare until the proposed increase is approved by the Public Service Commission and the Appellate Courts.

The report maintains there should be provision for through routing of cars in the contract. It also takes up certain specific points of the proposed agreement and attempts to show wherein their acceptance would prove either foolhardy or burdensome.

Canadian Roads Show Deficits

Of the 66 electric railways operating in Canada during the year 1920 only 13 declared dividends. A further 12 companies made a surplus, and the remaining 41 showed deficits. The average fare collected per passenger was 5.37 cents, as against 5.01 cents for the preceding year.

According to a bulletin just issued by the Dominion Bureau of Statistics, the total capitalization of these 66 electric railways was $170,826,404, made up of $91,321,955 of stocks and $79,504,449 of funded debt. As a whole, these railways showed a net operating revenue of $9,804,762, as against $9,312,884 for the year 1919. Total operating revenues increased from $40,698,586 in 1919 to $47,047,246, and expenses increased from $31,385,702 to $37,342,483. After paying taxes, interest, etc., there was a net corporate income of $954,818, as against $3,704,066 for 1919 and after making deductions for dividends there was a total deficit of $2,421,286.

There was an increase of 7.4 per cent in the number of passengers carried, and an increase of 15.3 per cent in passenger receipts. The number of employees was 17,341, an increase of 401, while the total payroll amounted to $24,435,932, an increase of 19.4 over the previous year.

Michigan Commission Charges Bad Faith

The Michigan State Public Utilities Commission has refused the Detroit United Railway the right to issue a stock dividend amounting to $385,000. The opinion, written by William W. Potter, says in part:

> The approval of the issuance of a stock dividend is a matter of discretion. This commission ought not to exercise its discretion in favor of a company which violates the law of the State and flouts its pledged word. The issuance of a stock dividend means only that the surplus earnings are transferred to capital and certificates of stock issued against them.
>
> If the company has earned, as it claims, a fair return, an addition to its surplus, capitalizing the contributions of the public to the company's stockholders, results in the public being compelled to contribute a fair return on a surplus accumulated from what, in excess of a fair return, the company has taken from the public.
>
> The Detroit United Railway already has so many bonds and so much capital stock outstanding that its shares are worth considerably less than par in the open market.
>
> To say the least, the actual value of the company's lines where franchises have expired, or will expire, is uncertain, speculative and conjectural and forms an altogether unsatisfactory basis for a stock dividend. The company's immediate prospective losses appear to demand the most skillful husbanding of its surplus, rather than the creation of a liability in perpetuity.

The reference to the company floating its pledged word is believed to refer to the railway's refusal to file its fare rates according to the Glaspie Act.

Business Splendid, Report of Motor Bus Company

Accomplishments of Detroit Motor Bus Company, Detroit, Mich., for first full year of operations exceeded expectations. First line was opened June 11, 1920, with six buses covering a four-mile route on Jefferson Avenue. Gross earnings now are averaging $3,500 daily, compared with $500 the first day.

During six months and twenty days of 1920, gross earnings were $250,000. For six months ended June 30, 1920, gross was $324,830 and for July $108,160. The following table shows how service has been expanded and monthly gross earnngs increased:

1921	Buses Operated	Miles Covered	Gross Earnings
July	59	259.434	$108,160
June	47	205,600	80,524
May	37	172,432	66,845
April	29	133,408	53,521
March	28	132,337	46,982
February	27	112,393	35,956
January	27	125,685	41,000

August figures show 68 buses in operation over 19 miles of route. Gross earnings for the month are expected to be about $110,000. After reserves for depreciation, the company shows a surplus of $62,000 from its operations.

Paid-in capital is $453,040 out of $1,500,000 authorized. The first dividend of 1½ per cent was paid July 1, 1921. Capital purchases are being made out of surplus and it is understood little additional stock will be offered.

Toledo Railway & Light Changes Name

The Toledo Railway & Light Company, Toledo, Ohio, controlled by Henry L. Doherty & Company, has called a special stockholders' meeting for Oct. 6, to vote on a plan to change the name of the company, increase its capital stock from $15,000,000 to $25,000,000, and merge it with the Acme Power Company, another Doherty property.

As the company's railway properties have been transferred to the Community Traction Company, a municipal project, the company proposes to change its name to the Toledo Edison Company. It is planned to issue $4,000,000 preferred stock at this time, to provide for developments and as a part of the plan for permanent financing of the company.

If the plan is approved, it means the cleaning up of practically all of Toledo Railway & Light bonds, and freeing the Community Traction Company of obligations. The $1,900,000 mortgage on the latter company, which was extended some time ago, will be taken up.

Financial News Notes

Line Abandoned. — Permission has been granted the Los Angeles (Cal.) Railway to abandon the line from the junction of La Salle and Washington Street south. The territory is served by the Washington line, which largely duplicated transportation. For this reason the city regulatory authorities permitted the track removal.

Receivership Terminated.—By a decree entered in the Superior Court on Sept. 6 by Justice Tanner, the receivership of the Rhode Island Company, Providence, R. I., has been terminated. The decree directs the receivers to deliver about $1,070,000 in cash and all their books and accounts to the United Electric Railways Company. The Rhode Island Company, organized to take over the largest part of the trolley lines in this state, went into a receivership on January 30, 1919.

More Franchises Surrendered.—Notice of the surrender of eight franchises from counties and municipalities has been filed with the Indiana Public Service Commission by the Terre Haute, Indianapolis & Eastern Traction Company and the Indianapolis & Northwestern Traction Company. The surrenders were made under the provisions of an act of the last Legislature. The companies will operate under an indeterminate permit from the commission. The franchises were from the following cities and counties: Frankfort, Zionville, Boone County, Clinton County, Crawfordsville, Montgomery County, Englewood and Lebanon.

Traffic and Transportation

"Club-Plan" Buses Busy

Police Officials at Bridgeport Restrained From Interfering With These Vehicles

Another complication has been added to the bus situation in Connecticut. Judge John J. Walsh, of the Court of Common Pleas signed an injunction restraining Superintendent of Police Flanagan and Assistant Prosecuting Attorney Vincent L. Keating from restraining the Bridgeport Bus Association from operating their 150 buses under the "club plan."

The bill of complaint was drawn up by DeForest & Klein, and Attorney Kilpatrick is named as the complainant. Immediately upon his return to Bridgeport with the signed injunction Attorney Kilpatrick delivered it to Attorney Klein, and the latter communicated with City Sheriff Dan D'Elia, who was given copies of the order for immediate service upon the superintendent of police and the assistant prosecutor.

BUSES TO BE OPERATED AT ONCE

President Kilpatrick stated that the buses of the association, which were stopped from operating on Sept. 1, would be operated on their regular schedule at once.

The injunction, which is returnable on Oct. 4, follows in part:

> Now therefore, you, the said Patrick J. Flanagan, superintendent of police of the said city of Bridgeport, and Vincent L. Keating, the assistant prosecuting attorney of the said city court, your servants, agents and attorneys under a penalty of $5,000 are hereby sternly commanded and enjoined that you do from henceforth wholly and absolutely resist from in any manner interfering with the use by the plaintiffs of the said conveyances for their own transportation over and along said highway until the first Tuesday in October, 1921, or until further order of the court or the undersigned in the premises.

On Sept. 1 the buses were stopped from operating by Superintendent Flanagan, after Jacob Sherwindt had been fined $5 and the costs for a violation of the jitney law. There followed two days of conferences between President Kilpatrick and Attorney Klein. On Sept. 3 the bill of complaint asking for the injunction was drawn up, setting forth the following claim:

BILL OF COMPLAINT

> 1. The plaintiffs are and for some time previous have been organized and associated as a partnership under the said name for the purpose of promoting and protecting their mutual rights and interests in transporting and conveying themselves over and along the public highways of the said city of Bridgeport and the adjoining territory.
>
> 2. For said purpose, they have at large expense procured for themselves conveyances known as motor buses and have been and are now desirous of lawfully operating same over said highways for the convenience of themselves.
>
> 3. The defendants claiming to act by virtue of their authority as public executive officers in the said city of Bridgeport have assumed to prohibit and interfere with these by the plaintiffs of said conveyances for their own transportation over the said highways and have threatened and are lawfully threatening to use force and violence to restrain and interfere with the exercise by plaintiffs with said right in using said highways for said purposes.
>
> 4. By reason of the said unlawful acts of the defendants the plaintiffs have been, and are prevented, from exercising said rights to use their said privileges for the purpose aforesaid and are therefore and have been put to great inconvenience, loss and expense, and will continue to be so interfered with and deprived of said rights and to suffer great inconvenience, loss and expense unless said unlawful acts of the defendants shall be restrained and prevented by injunction.
>
> 5. The plaintiffs have no adequate remedy for their loss. The plaintiffs claim:
>
> (a) $10,000 damages.
>
> (b) By way of equitable relief an injunction restraining the defendants, each and every one of their servants, agents, and attorneys from further interfering with restraining or preventing by force, threats, or otherwise the plaintiffs from operating their said conveyances over said highways for said purpose.
>
> William F. D. Kilpatrick of Bridgeport is recognized in $50 to prosecute. Of this writ with your doings thereon make due service and return.

Five-Cent Fare Privilege Extended

Additional 5-cent local fares were established by the Boston (Mass.) Elevated Railway on Aug. 13. The lines affected are those in Cambridge, Dorchester, Roxbury and Charlestown terminating at Sullivan Square or Harvard Square.

In Charlestown new rates of fare and method of operation will be put into effect on Main Street and Bunker Hill Street lines, running between Sullivan Square station and Brattle Street station subway, providing 5 cent local fare without free transfer, or a dime with free transfer.

Two lines will be run between Sullivan Square station and Brattle Street subway station, one via Main Street, the other via Bunker Hill Street, using the tracks in the subway now used by cars of the Eastern Massachusetts Street Railway Company. Prepayment cars will be used on both routes.

The 5-cent fare privilege will be further extended on Sept. 24 to eight additional local lines radiating from Dudley, Egleston Square and Forest Hills. The story of the new payment system on the lines of the Boston Elevated Railway was given in detail in the ELECTRIC RAILWAY JOURNAL, issue of July 9.

Would Furnish Complete Service

Long Beach (Cal.) residents can be assured of a complete transportation system if the city will enter into an agreement with the Pacific Electric Railway to arrange a fare schedule that will net a fair return. This opinion was recently expressed by Paul Shoup, president of the Pacific Electric property, during a visit to Long Beach.

Mr. Shoup explained how the plan worked in Fresno, where the city guaranteed the company an 8 per cent return. He said that temporarily bus feeders would have to be used, but that later an entire street-car system would be in operation.

Jitneys Ordered to Stop

Chief Executive of Kansas City to Compel Compliance With City Ordinance

The Mayor of Kansas City, Mo., on Aug. 29 ordered the suspension of jitney service on a northeast jitney route because of non-compliance with the regulatory ordinance. As a matter of fact, however, jitneys are still operating on many routes, though spasmodically.

The ordinance requires that operators of jitneys shall secure petitions containing names of the owners of a majority of the front feet of property on proposed routes. Jitneys were permitted to operate while petitions were being circulated, but in no case has an operator been able to obtain the "majority petition." In several instances petitions presented were found upon examination to lack the necessary majority, and jitneys which had continued on the assumption that the petitions were satisfactory were ordered to suspend.

Jitneys covering routes to the southeastern part of the city continued running several days after they were ordered to quit. They displayed signs offering rides free. Patrons usually gave the drivers tips. The practice was prohibited. Some jitneys are operating under signs indicating interstate traffic, as "Intercity Bus," or with names of cities in Kansas, adjoining Kansas City, Mo., displayed. Some buses merely extended their routes a few blocks in order to secure a terminal in the adjacent state.

A restraining order has been asked by the jitney association to enable the jitneys to operate without "consents" required by petitions. Up to Sept. 1 no such order had been issued.

An earlier ordinance ruled jitneys off of streets having street railway tracks. The park board has prohibited jitneys from operating on boulevards.

Perfect Safety Score Made by Pacific Electric in June

In a movement of 4,110,000 motor miles, equivalent to encircling the globe 164 times, the Pacific electric lines running out of Los Angeles to points throughout Southern California went through the entire month of June, 1921, without a single mishap in the way of a casualty accident in the operation of its cars and trains over its 1,100 miles of lines. The record is the more remarkable in the light of the fact that many of the casualties on railway lines are attributable to recklessness for which the carrier, its agents or employees are in no way responsible and against which no effective precaution can be taken.

Boston's "No Accident Week"

Drive Will Begin Sept. 25, Coincident with the National Safety Council Convention

A state-wide "No-Accident" Week, Sept. 25 to Oct. 1, is to be held in Massachusetts coincident with the annual session of the National Safety Council, which is scheduled to take place this year in Boston. An elaborate program of safety activities has been worked out in great detail. The plans for this "No-Accident" Week include a large amount of co-operation from the electric railways.

A special electric railway committee on safety matters has been functioning in Massachusetts for nearly a year in connection with the Massachusetts Safety Council, which is in reality a union of the local units of the National Safety Council. H. B. Potter, assistant general manager of the Boston Elevated Railway, is chairman of the electric railway committee, which numbers among its members representatives of the Worcester Consolidated, Boston & Worcester, Eastern Massachusetts, Union, and other large Massachusetts electric railways. Generous contributions have been made by the various electric railways toward defraying the expenses of the convention and the "No-Accident" campaign.

During the progress of the campaign special electric railway cars bearing appropriate banners advertising the safety work will be operated through all the cities and towns reached by electric railway tracks and will make themselves conspicuous by blowing whistles at frequent intervals. They are scheduled to run every day throughout the week. Dasher signs bearing the motto "Don't Get Hurt" are to be furnished to companies and carried on all cars during the whole seven days. Larger display posters are to be furnished for subway and elevated stations, terminals and waiting rooms.

Although the street railway end is only one detail of the main program, which is to include no-accident propaganda in shops, factories, stores, schools and on the highways, it is expected that very considerable benefits will result to the railway companies. A special drive is to be conducted to secure better co-operation from automobilists and motor-truck drivers in preventing collisions with street cars.

Governor Channing H. Cox is greatly interested in the coming events. He has volunteered the use of the State House Auditorium for the convention sessions of the National Safety Council. The Governor will address one of the meetings.

Establishes Freight Business

Freight earnings on the West Penn Railways, Pittsburgh, Pa., increased during the business depression as the passenger earnings decreased. Wholesale houses finding business falling rapidly diverted deliveries to its freight service, discontinuing use of trucks. The company is now negotiating with the Pittsburgh (Pa.) Railways for the Pittsburgh Terminal service with fair prospects of a favorable arrangement. Officials of the railway hope that having established this business it will continue when conditions return to normal.

Be "On Your Toes"

The significance of safe operation and courteous treatment of passengers is told by W. E. Dunn, vice-president of the Los Angeles (Cal.) Railway in the Aug. 29 issue of *Two Bells*, the official publication of the company. Mr. Dunn's remarks were occasioned by a statement in a previous issue of *Two Bells* to the effect that the complaint department would pretty soon be out of a job. He said that he remembered and had been inspired by the lively rivalry that had existed among the divisions for first place in the safety contest. He praised the men for their splendid record, and said that he felt proud to be associated with a property which was attracting the attention of operators of great systems in other cities. Mr. Dunn emphasized the exacting attitude of the public and the need for employees to be "up on their toes" at all times.

> **"I don't know which is more important, safety in operation or courtesy in operation. If a car is smashed in a collision, that car can be repaired and put back into service; but if the public is hurt by a collision of ideas or a collision between the mind of the trainmen and the public mind, there ensues a damage that cannot be easily remedied.**
>
> **"Public favor is sometimes a very hard thing to gain, and once gained it should be treated as a priceless jewel."**

Another Successful Five-Cent Line

Ft. Madison, Ia., now occupies the unique distinction of being the only city in Iowa to retain 5-cent fares. The Mississippi Valley Electric Company, which operates there, has been able to hold down to the traditional fare only because there is an unusual condition in Ft. Madison. In the first place, the city has a population of 12,000 people, and there are only 4 miles of track. Power obtained from the Keokuk dam, only 25 miles away, is cheap. Contracts for this power were made before the war. Another feature in keeping expenses down has been the operation of one-man cars. Still another factor has been the absence of buses or jitneys. The Mississippi Valley Electric Company bought the plant six years ago from the Ft. Madison Street Railway when it was a losing proposition. In spite of improving service, the new company has been able to put the line on a paying basis.

Interurban Fare Ruling Reargued

The State Supreme Court recently heard the appeal of the Georgia Railway & Power Company, Atlanta, Ga., from the decision of the lower courts in the matter of 7-cent fares on its interurban lines to College Park and Decatur.

The Railroad Commission, in granting the 7-cent fare in the city of Atlanta, held that it had no authority to regulate the fares to College Park and Decatur, because of existing contracts between these municipalities and the power company. Thereafter the power company sought to institute 7-cent fares of its own accord, and the municipalities instituted injunction proceedings in the superior court, where each of them was successful. The courts granted the injunction restraining the power company from charging 7-cent fares on the lines between College Park and Decatur.

The power company appealed to the supreme court, and the case was argued last winter. Since this argument, it appears that Associate Justices Hill and Atkinson have been disqualified through the fact that they are related to persons who own stock in the power company. In their places were Justices Meldium of Savannah and Wright of Rome. No decision has been handed down.

Jitneys Will Be Barred

As the result of action taken by City Manager Locke and the city commissioners of Grand Rapids, Mich., jitney buses will undoubtedly be barred from those streets on which the railway operates lines. The Grand Rapids Railway recently protested against jitney competition and the matter was referred to the city manager and a special committee of commissioners for investigation. The company presented figures which showed large losses due to jitney competition.

City Manager Locke in explaining the proposed action said that it was not the intention to abolish the jitney in the city, but that the lowest possible electric railway fare was desired. Further, he said that the jitneys should not be permitted to operate on streets occupied by car lines.

This ruling will be put into effect as present licenses expire. A reduction in car fares, made effective recently, makes the cash fare in Grand Rapids 10 cents, with four tickets for 25 cents.

Lower Fares Increase Traffic.—Since fares have been reduced a half a cent to 8 cents and the "pay-as-you-enter" system re-established on the lines of the Cincinnati (Ohio) Traction Company, there has been a noticeable increase in the number of passengers. William Jerome Kuertz, Director of Street Railways, said that on Aug. 1, when the reduction went into effect, the number of fares increased 6,000. The fares collected were 295,517 on Aug. 1, as compared with 289,176 on the previous Monday.

Increased Rates Refused—Service Cut

The South Carolina Railroad Commission has refused the petition of the Augusta-Aiken Railway & Electric Corporation for an increase in zone fares from 5 cents to 9 cents a zone. At the same time the railway was authorized to reduce its service 50 per cent.

Several months ago the company requested an increased zone rate between Augusta and Aiken. A hearing was held on March 16 and much testimony was submitted. In its findings the commission states that conditions in the communities served by the railway were far from normal and that a solution to the problem was needed which would retain the traffic and at the same time reduce operating expenses.

It was a question of reducing service or increasing rates. The commission was of the opinion that in view of the present conditions the people could better put up with a reduced service than with higher fares. The order went into effect on Aug. 28.

Inspiring Employees to Merchandise Transportation Service

Upon taking up his new position as general manager of the Tri-City Railway of Iowa, Davenport, recently, R. J. Smith sent out a letter to each employee at his home which was intended to inspire a better idea of the merchandising aspects of his job. The letter was very well received, and is considered worth reproducing. The part of the letter dealing with this aspect follows:

> We are manufacturers and sellers of transportation, and as such we shall require a good property throughout and the brain and heart of each individual of us—brain to plan, and heart to keep at it and enjoy it. Of these three requisites only the property is at all lacking. In some respects, as for example certain trackage, we shall have to bend our every effort to improve the property. Many of us forget the selling end of the business. It's of no use to make a commodity that you don't dispose of. Empty car seats are transportation unsold. The manufacturer must sell his product. Let's sell ours. How?
>
> By doing as other merchants do—furnish a good article; charge a fair price; advertise; and be friends with the customer.
>
> What have you and I to sell? More than just a ride. For 8 cents we are now selling not only a ride from 500 ft. to 50,000 ft. in length, but also cool breezes in summer, snug warmth in winter, safety, reliability, cleanliness, decency, good light for reading, room for carrying bulky articles, a lost-and-found service, general information, watchfulness over children and the infirm, and finally an insurance policy covering person and property. A splendid package for 8 cents! Surely a good article at a fair price. We salesmen, then, can take pride in handling such a line of goods.
>
> Therefore advertise this excellent buy. Talk and act its virtues every chance you get. Study to improve the quality and then advertise the improvement.
>
> And let's make every customer feel that we are glad to have him with us and want him to come again. Pleasure in our work of serving him, courtesy and good appearance will help us immeasurably in making him feel how really interested we are in giving him the most for his money.
>
> Our principal salesmen are those among you who operate the cars. You are the business getters, for you come in direct contact with the customers, and it is your personal responsibility to attract every possible rider. Your acquaintance is enormous, and to all these people you operators are the representatives of the company—you are the company. They judge it by you. See to it that their judgment is favorable. The personal contact with the customer is invaluable. Use it to serve and to sell.
>
> For, that is the heart of the problem—to sell. If we can sell all we can make, we shall do our job well.
>
> You have heard that the street car is passing on—is a dead one. The ablest students of transportation state that for dependability, speed, safety and cheapness, nothing has yet been devised to equal the electrically driven car on rails. We shall have such cars for some considerable time.
>
> And we must remember this. It is not the Pierce-Arrow nor the Ford which we have most to fear. Our greatest competitor is shoe leather. We must sell the services of the Tri-City Railway of Iowa until no one will think of refusing to pay our small fee and receive the great benefits we are so ready to give.
>
> Efficiency in operation, integrity in collection, and courtesy with our patrons will put this company upon its feet and make better jobs for us all. Our boss is the Public. Let's please it.

Transportation News Notes

Cash Fare Advanced.—Permission has been granted to the Frankford, Tacony & Holmesburg Street Railway, Philadelphia, Pa., to charge an 8-cent cash fare with eight tickets for 50 cents, zone limits at Blakiston and Decatur Streets and a monthly book of tickets for $4.50. The new rates will continue in effect for a year.

Increased Fare Allowed.—The Athens Railway & Electric Company, Athens, Ga., was recently authorized by the State Railroad Commission to increase its fares from 6 cents to 7 cents. The order became effective on Sept. 1.

Fare Rise Granted.—The State Railroad Commission of Georgia recently issued an order authorizing the Valdosta Street Railway to increase its carfare from 6 cents to 7 cents. The Chamber of Commerce of the city wrote the commission that it approved of the increase.

Popularizing Parcel Post.—Letter mail boxes have been placed on the Lake Minntonka cars of the Twin City Rapid Transit Company, marked: "Minneapolis to Tonka parcel post service. Deposit request for pickup in this box and carrier will call at your door for package. Trucks will arrive at this point at — a.m. E. A. Purdy, postmaster." This is designed to expedite and make popular the new parcel post delivery by automobile truck.

Will Appeal Ten-Cent Fare.—Following the decision of the Public Service Commission authorizing the Buffalo & Lackawanna Traction Company, Buffalo, N. Y., to charge a 10-cent fare without transfer, the councilmen have directed Corporation Counsel Rann to appeal the ruling. The railway will first apply for a rehearing. If this is denied a certiorari proceeding to review the commission's decision will be started.

Arrangements Made for Classifying Freight.—The Northwestern Ohio Railway & Power Company has arranged with the Detroit (Mich.) United Railway for the issuance of class rates on freight from all points in Michigan served by the Detroit United to points on the Northwestern Ohio system. The Detroit United serves practically all of Southeastern Michigan and it is believed that large business will be the result under class rates.

Railway Co-operates With Auto Club.—The Public Service Railway, Newark, N. J., has notified the New Jersey Automobile & Motor Club that it will co-operate in the campaign to rid the streets of broken glass and bottles. N. W. Bolen, general superintendent of the railway, says that all the motormen and conductors will be instructed to remove broken glass from the streets or report it to the proper authorities when they discover it along the tracks. The order will also apply to glass scattered along the streets following collisions.

Applies For Ten-Cent Fare.—The New York State Railways applied to the Public Service Commission on Aug. 6 for a 10-cent fare in Oneida and between the zone of Wampsville and Kenwood. The fare at present is 5 cents. B. E. Tilton, vice-president of the company, said he thought the decreased patronage was due more to business depression than to jitney competition. J. E. Duffy, general superintendent at Oneida, stated that although there was no bus competition in the city of Oneida there was considerable in outlying districts, especially between Oneida, Sherrill and Kenwood.

Jitney Dispute Before High Court.—Claiming that a half dozen jitney buses have been operating between Pennsgrove and Carney's Point, N. J., without approval of the Public Utility Commission, the Salem & Pennsgrove Traction Company on July 28 carried the dispute to the New Jersey Supreme Court. The railway charges that licenses were granted to the jitney men by Upper Penns Neck Township since March 15, the date when the 1921 law placed the jitneys under the regulation of the Commission. Supreme Court Justice Katzenbach has directed the jitney operators to show cause in Camden, N. J., why the jitneys should not desist from operating, pending approval of their municipal licenses by the Commission.

Bus Permits Granted.—Nine applications for the privilege of operating bus lines within New Jersey were granted on Aug. 23 by the Board of Public Utility Commissioners. Nineteen other applications were denied on the ground that existing electric railways with which the proposed bus lines would compete now furnish adequate service. Eight of the applications granted were for routes in Camden County, between Camden and Brooklawn, Camden and Gibbstown, Camden and Blackwood, Swedesboro and Camden, Williamstown and Camden and Camden and Highland Park. Franchise was also granted for operation of buses between Butler and Newark. Provision was made in each case that local traffic within the areas served by electric railway systems would not be carried.

Personal Mention

Mr. Hukill Traffic Manager

New York Central Man Joins F. H. Wilson, a Former Associate, on Cleveland Southwestern

Edmund L. Hukill is the new traffic manager of the Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio, succeeding C. C. Collins, who resigned on July 15. Mr. Collins, who had been traffic manager of the interurban line for more than four years, has not announced his plans for the future.

Mr. Hukill is new to the electric railway industry, having been associated with steam railroads prior to assuming duties as traffic director of the Ohio interurban line. When he accepted the position with the Cleveland, Southwestern & Columbus Railway, Mr. Hukill was special representative of the assistant general manager of the New York Central Railroad, D. R. MacBain, Cleveland.

Mr. Hukill's experience as a railroad man began in 1907 when he started work in the freight offices of the Lake Shore Railroad in Chicago. He was there two years when he was transferred to Sandusky, Ohio, where he remained four years. In 1915 he was transferred to Toledo, where he was chief clerk in the office of the terminal yardmaster and later in the traffic department of the New York Central.

In 1918 Mr. Hukill became associated with F. H. Wilson, who was then general superintendent of the New York Central and who is now president and general manager of the Cleveland Southwestern. Mr. Hukill was in the office of Mr. Wilson until the latter went with the Cleveland Southwestern in March of this year. Since March, Mr. Hukill had been in the office of Mr. MacBain.

Mr. Collins has been traffic manager of the Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio, since 1917. His career as a railway man was begun in 1890 and has been largely concerned with traffic problems. In that year he became chief clerk in the traffic department of the Columbus & Eastern Railroad. This road was later merged with the Columbus, Sandusky & Hocking Railway upon its completion and Mr. Collins was made division freight agent at Toledo. When the road was sold to the Pennsylvania Lines in 1898, Mr. Collins engaged in business in Porto Rico.

Upon his return to Ohio and following a short connection with the Detroit, Toledo & Ironton Railroad he was appointed general express and passenger agent of the Columbus, London & Springfield Railway, Springfield, Ohio, the position he held until 1907. At that time he entered the service of the Western Ohio Railroad, Lima, Ohio, and a year later was made traffic manager of the system. He resigned this position in 1911 to take a similar one with the Lehigh Valley Transit Company, Allentown, Pa. Mr. Collins was one of the organizers of the Central Electric Railway Association, and has displayed an active interest in its affairs.

Bion J. Arnold the Subject of a Magazine Sketch

Bion J. Arnold, engineer, and a pioneer in electric railroad projects, is the subject of an interview by Neil M. Clark in the *American Magazine* for August. More than forty years ago, in the small town of Ashland, Neb., Mr. Arnold's greatest sport was watching repair work in progress on the bridge of the Burlington Railroad over Salt Creek near the Platte River. He was fascinated by the locomotive and hoped for a day when he could "make engines go." His genius for invention found expression in an engine he himself built at the age of fourteen. This engine is now in his office in Chicago. Despite opposition to his ambition, lack of facilities and a none too strong physique, he went ahead. His technical training was obtained at Hillsdale College. His early position as a draftsman in Milwaukee and another building a 300-hp. cross-compound engine for a Dubuque company, started Mr. Arnold on the road to success. The various achievements in the years that followed are well known to engineers everywhere. "To want something so hard that it hurts if you can't get it" gives some idea of Mr. Arnold, the man. He says that nothing can stop a man who has that desire and that, in his own particular case, obstacles became stepping-stones to his objective.

F. H. Harris Leaves Charleston Consolidated

F. H. Harris, superintendent of equipment of the Charleston Consolidated Railway & Lighting Company, Charleston, S. C., recently resigned to accept an appointment as master mechanic of the Charleston (W. Va.) Interurban Railroad. Before his departure for Charleston, W. Va., to take up his new duties on Sept. 1 the shop employees presented him with a silver tea set and all expressed their best wishes for his success in his new position. His thirteen years' association with the employees of the Charleston Consolidated had made many ties that were hard to break. The position made vacant by Mr. Harris has been filled by Ernest C. Barker, formerly in charge of the electrical department of the railway shops of the Charleston Consolidated Railway & Lighting Company.

Mr. Barker was born in Barking, Essex, England. He was educated in English schools and came to the United States while a young man, in 1906. He went into the shipping department of the Western Electric Company, New York, testing telephone switchboards for shipping. About a year later he tested and installed meters for the Public Service Electric Company in Hackensack, N. J., while in 1908 he had charge of wireless operation on one of the ocean liners of the American Steamship Line. In the latter part of 1908 he went into the repair shops of the New Jersey & Hudson River Railroad & Ferry Company, and remained on the property when it became the Bergen division of the Public Service Railway.

Mr. Barker went to the New York Subways to wire the new cars for 10-car train operation, and was there about a year. He then returned to the Bergen division of the Public Service Railway, entering the repair shops at Edgewater as electric repairman and became foreman of the shops in 1917. In February, 1919, he accepted a position in the Charleston Consolidated Railway & Lighting Company shops at Charleston, S. C., as electrical foreman, and was appointed master mechanic Aug. 16, 1921.

Thomas G. Hill now occupies the position as chief claim adjuster of the Capital Traction Company, Washington, D. C.

F. C. Eckmann, general manager and purchasing agent, has become vice-president of the Joliet & Eastern Traction Company, Joliet, Ill., following the resignation of Robert Kelly.

A. E. Robertson, formerly vice-president of the Coal Belt Electric Railway, Marion, Ill., has been appointed president of the company to succeed J. G. Drew of St. Louis. Also O. E. Coyne is the successor of H. H. Berry as superintendent of the property.

Kazutada Sakurai, equipment engineer of the Municipal Street Railway lines in Tokio, Japan, has recently arrived in New York, where he expects to make his headquarters for the next year or two in his study of American electric railway car shops, carhouses, and car buildings. Mr. Sakurai has spent about seven months in Chicago making similar studies. He may be reached in care of the Japanese Consul-General, 165 Broadway.

C. M. Bange, whose appointment as master mechanic of the Interstate Public Service Company, with headquarters at Scottsburg, Ind., was announced in these columns on Aug. 27, was for three years master mechanic of the Detroit, Rochester & Romeo Railway. For five years he served as master mechanic of the Detroit-Ypsilanti-Ann Arbor & Jackson Railway. Both of these companies now form a part of the Detroit United Railways. He served as superintendent of power and equipment of the southern division of the Northern Ohio Traction & Light Company for two years and for eleven years was superintendent of equipment and overhead, Elmira Water, Light & Railroad Company, Elmira, N. Y.

Frederick I. Cox, of New Jersey, was nominated on July 22 to be a member of the Interstate Commerce Commission in place of Edgar E. Clark, chairman, who has resigned. It was said that Judge Clark felt that he had reached a time in his life when he could no longer afford to serve the public at the comparatively small compensation, and will go into private business. Mr. Cox was selected by President Harding as a representative of the great body of commercial traveling men. The President has set a policy of appointing to the board men characteristic of various elements of the national life affected by the railroads. Mr. Cox was born in Dover, O., in 1849.

Obituary

Martin J. White, chief supervisor of the city buses of the New York Department of Plant and Structures, died Sept. 1 at the age of forty-four. Mr. White took charge of the bus system a year ago. He graduated from Manhattan College in 1897.

William H. Guyton, superintendent of transportation East St. Louis & Suburban Railway, died recently. Mr. Guyton began his street railway career as a conductor in Kansas City and later in St. Louis and was a conductor with the Old Day Line Company, one of the predecessors of the East St. Louis & Suburban Railway. He later became superintendent of this company when it was consolidated with the East St. Louis & Suburban Railway and subsequently became superintendent of the entire system.

George C. Killeen, superintendent of the Southern New York Power & Railway Corporation, Cooperstown, N. Y., died on Aug. 31. Mr. Killeen was a native of Elizabeth, N. J. His age was 46 years. After attending the public schools of Middletown, N. Y., where most of his early life was passed, he entered the employ of the Middletown Traction Company, with which he remained four years. Later he removed to Staten Island, where he was engaged with the Staten Island Railway, remaining there for two years and going afterward to Brooklyn, where he held for ten years a responsible position as master mechanic and where he did some excellent work directing new installations and development plans. Five years ago he came to the Southern New York company as master mechanic and later was made superintendent both of the shops and of the company's power plants and trolley lines. In the latter position he was proving most capable and efficient and his loss will be felt not only by the officials but by all employees of the company as well.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Lower Prices on Some Poles and Cross-Arms

Reductions were reported last week in certain poles and cross-arms. Chicago, St. Louis and New York territories report that Northern white-cedar poles in lengths from 25 ft. with 4-in. top to 35 ft. with 7-in. top were reduced about Aug. 19 in varying amounts from 15 to 25 per cent, depending on size, grade and classification. Utilities around St. Louis showed a tendency to hold off buying until the fall demands make it necessary, and the reduced prices are stimulating pole sales. Present inquiries indicate a rather healthy business for the next few months. Stocks are in good shape.

Around Chicago the demand has been slow and uneven, and pole movement has not reacted as yet to the price cost. Buying around New York, too, is rather quiet.

Yellow-pine cross-arms have come down about 10 per cent in the past ten days. No change has been reported in fir arms. Railways and utilities in the Southwest are providing a fairly good call for these yellow-pine arms.

Coal Output Has Found a Level

Production of soft coal, says the weekly report of the United States Geological Survey, appears to have found a level for the time being at about 7,750,000 tons a week. The total output during the week ended Aug. 27 is estimated at 7,755,000 net tons, as against 7,771,000 and 7,713,000 tons in the weeks of Aug. 13 and 20, respectively. Preliminary reports indicate no great change during the week Aug. 29 to Sept. 3. Stationary production at this season of the year is exceptional. The normal trend is upward fairly steadily from April to November.

High-Voltage Transmission Equipment for Midi Railway

The order for electrical equipment for the Midi Railway in France, as announced in the ELECTRIC RAILWAY JOURNAL for July 20, will be used on the transmission system being built by the Midi Company for supplying power to operate the railways and also industrial concerns. The Westinghouse Company will use its Essington works, near Philadelphia, for the manufacture of a large part of this machinery and equipment, the order for which totals between $1,200,000 and $1,500,000.

The equipment includes only apparatus for the construction and operation of this power line at 154,000 volts. Eleven 6,660-kva. single-phase, 50-cycle outdoor-type transformers with a voltage ratio of 60,000 to 89,000 will be connected in star on the high-voltage side to give the transmission voltage of 154,000. For step-down service 14 6,600-kva. 86,700 to 34,600-volt transformers will be required. These will be connected in groups of three for 3-phase operation and connected in star on the high-tension side for 150,000 volts. Also they will be designed with a tertiary winding for 6,600 volts delta connected for supplying power to synchronous condensers. For line regulation 2 15,000-kva. and 4 2,000-kva. self-starting synchronous condensers are to be installed. They are 6,600-volt 3-phase 50-cycle machines, operating at 600 r.p.m. Lightning protection will be afforded by 13 154,000-volt 3-pole electrolytic arresters.

Crocker-Wheeler Company Sells Canadian Plant

The plant and business of the Canadian Crocker-Wheeler Company, Ltd., St. Catharine's, Ont., have been purchased by the newly incorporated English Electric Company of Canada, which is a subsidiary of the English Electric Company of London, England. Gordon F. Perry, president of the National Iron Corporation, Ltd., Toronto, is chairman of the board of directors of the English Electric Company of Canada, Ltd., and the Canadian concern will have on its board of directors a number of other men prominent in industrial and financial circles in Canada.

It is understood that this company has obtained a large order from the Hydro-Electric Power Commission of Ontario and several weeks ago the company was awarded a large contract by the Toronto Transportation Commission. The Canadian company holds the exclusive manufacturing rights for Canada in perpetuity for all lines manufactured by the English Electric Company, Ltd., and will also act as selling agent for the latter company. The Canadian company has the right to sell its own products in the United States as well as in Canada, and is to have the use of all patent designs and processes of the British company.

Special attention will be paid by the company to the manufacture of electrical equipment and rolling stock for railways and tramways, and of switch gear and control apparatus of all kinds.

The parent company in England is said to be the largest manufacturer of electrical supplies and allied machinery and equipment in the British Empire, and the directorate includes some of the most prominent men in Great Britain. The company maintains eight branches in the United

Kingdom and ten abroad. The parent company is now undergoing a worldwide development and is putting up several new plants, particularly in France near Lyons, and in Belgium near Liege. A new plant has been erected at Tarbes and the works in Ghent will also be extended shortly.

Electrification Postponed

The Delaware, Lackawanna & Western Railroad recently rejected all bids received for electrical equipment for the electrification of a section of its line in the anthracite region of Pennsylvania. It is expected to advertise for new bids at an early date. Gibbs & Hill, New York, are consulting engineers.

The Delaware, Lackawanna & Western is the only road at present actually in the market for electrical equipment. While the plans of that company are pretty definite, they have not been announced beyond the statement of President Truesdale in the last annual report that a mountainous section of the company's line in Pennsylvania would probably be electrified soon, although the recent advertisements for bids gave no clue to probable time that will elapse before work is begun.

Wire Makers Considering Monthly Survey

Manufacturers of insulated wire now have the opportunity to have their product included in the survey now being made for twenty other industries, the reports of which are published by the Department of Commerce in the monthly *Survey of Current Business*, first issued under the date of July 1, 1921. Herbert Hoover, Secretary of Commerce, has appointed W. M. Steuart, who is director of the *Survey of Current Business*, as his representative to meet in New York City on Sept. 13 the manufacturers of insulated wire, represented by four groups—bare wire, rubber-covered wire, weatherproof wire and magnet wire. It is his intention to have Mr. Steuart discuss with them the best methods to adopt for obtaining from each group monthly reports on production, current stock and distribution in their respective industries.

If insulated wire manufacturers succeed in having their products included in this survey, they will have before them current comparative information never before available which should enable them to better forecast the volume and conserve the stability of their industry.

Westinghouse Order from Japan

The Westinghouse Electric International Company has received an order for two electric freight locomotives from the Japanese Government to be used in service near Tokio. These locomotives, which will weigh 62 tons and have a capacity of 1,000 horsepower each, will operate on the 1,500-volt direct-current system.

Rolling Stock

Preston Car & Coach Company, Ltd., Preston, Ont., has entered into an arrangement with car manufacturers in the United States, who, it is understood, have orders from the Toronto Transportation Commission and from other Canadian sources, whereby the manufacturing for the Canadian trade will be done by the Preston Co. It is understood that shareholders will give their approval to the arrangement when details are placed before them at the meeting which has been called for the purpose.

Bamberger Electric Railroad, Salt Lake City, Utah, has included in its program this fall the purchase of twenty box cars of the latest type. They are constructed with steel underframes and equipped with the latest improvements. The first one of these cars has just arrived, and two others are expected shortly. The remainder of the cars will be received later in the fall. The new cars were ordered to replace some of the older equipment, and to provide better and more service for Salt Lake and Ogden merchandise. The company is constructing its own passenger cars, and is keeping an adequate supply on hand to meet the demands of the passenger business.

Track and Roadway

Detroit (Mich.) Municipal Railway has commenced operation on the Charlevoix-Buchanan crosstown line.

Midland Pennsylvania Railway, Pottsville, Pa., will be built shortly according to the new owners who recently bought the right-of-way for $33 000. Tracks had never been laid by the original owners.

Petaluma & Santa Rosa Railroad, Petaluma, Cal., has asked the city to build a new bridge over to D Street which will be wide enough for the electric trains to cross. If this is done the railway will share the expense with the city.

Pacific Electric Railway, Los Angeles, Cal., has asked the trustees of the city of Whittier for permission to remove its tracks on Greenleaf Avenue. The tracks extend about two blocks from Philadelphia south on Greenleaf.

Meridian Light & Railway Company, Meridian, Miss., must level its track on the Twenty-fourth Avenue car line or else remove it. The city has reached this point in this paving program and will proceed to pave over the tracks unless the company takes immediate action.

Cincinnati (Ohio) Traction Company will build an extension to one of its lines from Price Hill to Covedale. The North American Railway Construction Company, Chicago, has been awarded a contract for this improvement, which will cost approximately $20,000.

Grand Rapids (Mich.) Railway may eliminate interurban traffic from its tracks in the city. Engineers of interurban railroads have been inspecting all the property along Front Avenue between Bridge and Shawmut Streets with a view of acquiring it for a union station, the necessary yards and sidewalks.

Northern Ohio Traction & Light Company, Akron, Ohio, is making extensive repairs to its track in Akron, Canton and Massillon. In Akron repairs are being made to tracks in Main Street from Federal Street to Thornton. The East Akron carhouse and tracks layout are being finished at an approximate cost of $30,000. In Canton double track on South Main Street from Sixth Street S. W. to Navarre is being renewed. Single track on East Tuscarawas is being replaced by double track at an approximate cost of $136,000. In Massillon about 500 ft. of track has been renewed at the City Hospital.

Power Houses, Shops and Buildings

The Hydro-Electric Railway will install additional rotary converters at Windsor and Amherstburg, Ont., with an automatic sub-station at the latter point.

Bamberger Electric Railroad, Salt Lake City, Utah, and the Orem Railroads will have a joint terminal at the corner of South Temple and West Temple Streets, Salt Lake City. The cost is estimated at more than $200,000.

Tacoma, Wash., has purchased a transformer weighing 80,000 lb. to be installed in its new substation at North Twenty-first Street. This shortest street railway line, which went into operation recently, will be used in transferring the transformer to its concrete platform built for it between Washington and Adams Streets on Twenty-first Street. The line will be taken up as soon as this transformer has been removed.

Trade Notes

The Green Engineering Company, East Chicago, Ind., has placed on the market its Green sidewall waterboxes for furnace settings.

Industrial Products Company, Philadelphia, Pa., has recently placed on the market a first aid dressing for serious burns and scalds. It consists of a solution of bicarbonate of soda and mineral placed in a patented container.

Automatic Sliding Trolley Company has been organized at Frankfort, Ind., and incorporated under Indiana laws with a capital stock of $10,000. The company will manufacture automatic sliding trolleys and other devices for street railways. Organizers of the company are William Robinson, E. C. Spray and J. A. Lucas.

Westinghouse Electric International Company has opened an office in Shanghai, owing to the growth of business in China. This office will have eventually several branches throughout the country in order to adequately handle inquiries and negotiations for electrical equipment. J. D. Birrell, who has long been engaged in business in the Far East, is the manager of the new office.

Edward A. Craig, manager of the export department of the Westinghouse Air Brake Company, Wilmerding, Pa., died on Aug. 28. He was first taken ill while he was making preparations for his transfer to the West, where he was to reorganize the Westinghouse Pacific Coast Brake Company and the Pacific Coast district. Mr. Craig's position in the air brake organization was in many respects unique. His connection with the company began in 1888, when he became a messenger at the age of fifteen. His first promotion was to secretary of the general superintendent of the works. This led to his appointment as assistant auditor and then as auditor and assistant secretary. In 1906 the air brake company established the Southeastern District and in the selection of a manager for that office, the choice fell upon Mr. Craig, who conducted its affairs with marked success until 1920. In January of that year the company organized the export department and, in the consideration of an executive head for that department, the management once more showed its faith in Mr. Craig's ability by giving him the appointment. Mr. Craig grew up with the organization and never forgot his former associates in the shops even after taking up executive work.

New Advertising Literature

Demand Meter. — The Esterline-Angus Company, Indianapolis, Ind., has recently developed a graphic kilowatt-ampere demand meter.

Panels.—The Automatic Electrical Devices Company, 120 West Third Street, Cincinnati, is distributing bulletin 624, describing its new "Unipanel" refinements.

Electric Welder.—The Automatic Electrical Devices Company, 120 West Third Street, Cincinnati, has issued bulletin 623, describing its automatic arc welder.

Temperature Regulation. — The Gold Car Heating & Lighting Company, Bush Terminal, 220 Thirty-sixth Street, Brooklyn, is distributing a new catalog on its electric thermostat temperature regulating systems.

Portable Compressors, "Portable Air Service" is the title of a four-page leaflet distributed by the Ingersoll-Rand Drill Company, 11 Broadway, New York City, describing the different types of "Ingersoll-Rand" portable compressors.

Texas Company, New York, is issuing a booklet called "Lubrication of Steam Turbines." It describes various lubricating methods and oiling systems besides discussing the effects of heat, water, deposits, cleaning, starting and oil coolers on the effectiveness of lubrication.

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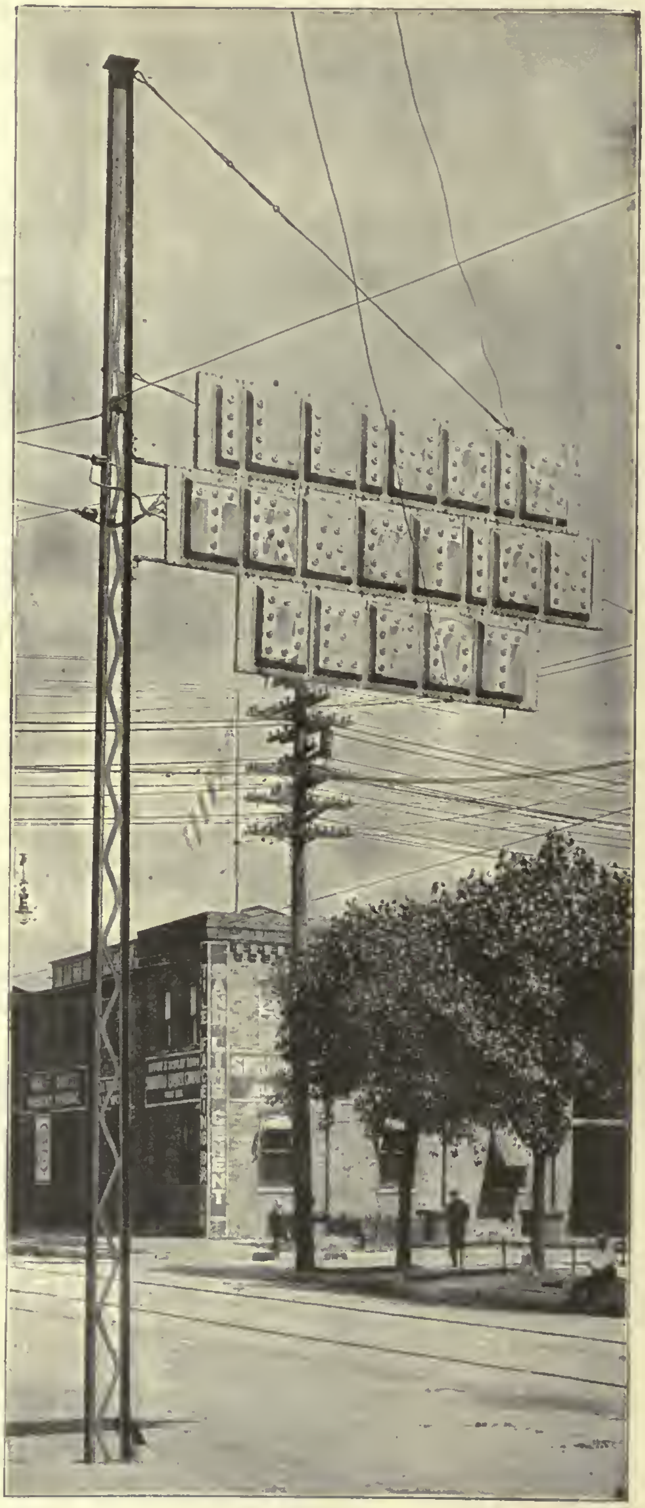

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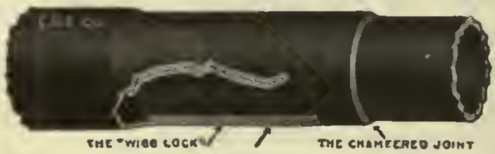

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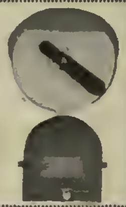

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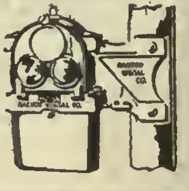
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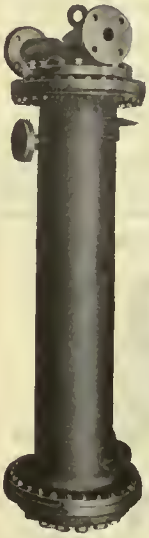

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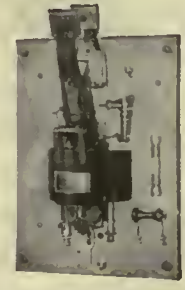

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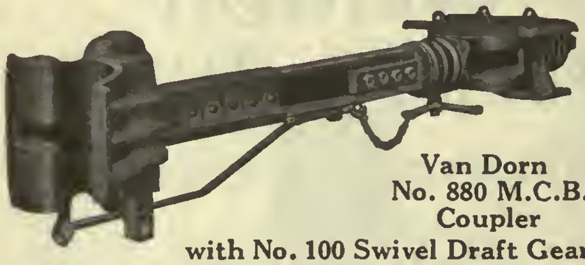

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with No. 100 Swivel Draft Gear

Interchanges with all standard M.C.B. Couplers on both steam and electric railroads.

Couples automatically by impact. Uncouples from outside of car.

Extended guard arm and butting wall make coupling positive and certain, even when couplers are greatly out of line.

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This Coupler is especially adapted to low cars.

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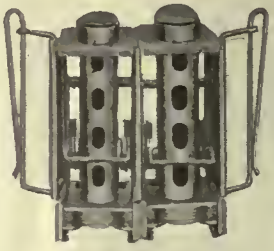

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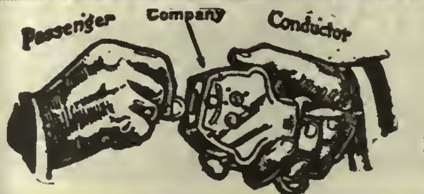

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Anchors, Guy
Electric Service Sup. Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Automobiles and Buses
Brill Co., The J. G.

Axles
Bemis Car Truck Co.
St. Louis Car Co.

Axles, Car Wheel
Bemis Car Truck Co.
Brill Co., The J. G.
Standard Steel Works Co.
Westinghouse E. & M. Co.

Axle Straighteners
Columbia M. W. & M. I. Co.

Babbitt Metal
More-Jones Br. & Metal Co.

Babbitting Devices
Columbia M. W. & M. I. Co.

Badges and Buttons
Electric Service Sup. Co.
Internat'l Register Co., The

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Elec. Storage Battery Co.

Bearings and Bearing Metals
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Columbia M. W. & M. I. Co.
General Electric Co.
More-Jones Br. & Metal Co.
St. Louis Car Co.
Westinghouse E. & M. Co.

Bearings, Center and Roller Side
Stucki Co., A.

Bearings, Oilless, Graphite, Bronze and Wood
Bound Brook Oil-less B. Co.

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Columbia M. W. & M. I. Co.
Electric Service Sup. Co.
St. Louis Car Co.

Benders, Rail
Niles-Bement-Pond Co.
Railway Track-work Co.

Bending Apparatus
Railway Track-work Co.

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Bonding Apparatus
American Steel & Wire Co.
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Electric Service Sup. Co.
Ohio Brass Co.

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Copper Clad Steel Co.
Electric Ry. Improv. Co.
Electric Service Sup. Co.
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Ohio Brass Co.
Railway Track-work Co.
Westinghouse E. & M. Co.

Boring Tools, Car Wheel
Niles-Bement-Pond Co.

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Electric Ry. Equip. Co.
Electric Service Sup. Co.
Hubbard & Co.
Ohio Brass Co.

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Hamilton & Hansell, Inc.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
Amer. Br. Shoe & Fdry. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

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Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
Horne Mfg. Co.
National Brake Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.

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Amer. Rattan & Reed Mfg. Co.

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General Electric Co.
Jeandron, W. J.
Morganite Brush Co., Inc.
U. S. Graphite Co.
Westinghouse E. & M. Co.

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Columbia M. W. & M. I. Co.

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Trackless Trans. Co.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.

Bushings, Graphite and Wooden
Bound Brook Oil-less B. Co.

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Cambric, Yellow and Black, Varnished
Irvington Varnish & Ins. Co.

Carbon Brushes (See Brushes, Carbon)

Car Panel Safety Switches
Westinghouse E. & M. Co.

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Differential Car Co.

Cars, Passenger, Freight, Express, etc.
American Car Co.
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Wason Mfg. Co.

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Electric Equipment Co.

Cars, Self-Propelled
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American Steel Foundries
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Columbia M. W. & M. I. Co.
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Ohio Brass Co.
Wood Co., Chas. N.

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Cutter Co.
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Hubbard & Co.
Ohio Brass Co.
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Brill Co., The J. G.
Ohio Brass Co.

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Westinghouse E. & M. Co.

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Johnson Fare Box Co.

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Electric Service Sup. Co.
Internat'l Register Co., The
Roebling's Sons Co., J. A.
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Silver Lake Co.

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Electric Service Sup. Co.
Samson Cordage Works
Wood Co., Chas. N.

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Amer. Steel Foundries
Brill Co., The J. G.
Ohio Brass Co.
Van Dorn Coupler Co.
Westinghouse Tr. Br. Co.

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Crossing Foundations
International Steel Tie Co.

Crossing Signals (See Signals, Crossing)

Crossings, Frog and Switch
Wharton, Jr., & Co., Wm.

Crossings, Track (See Track, Special Work)

Crushers Rock
Allis-Chalmers Mfg. Co.

Culverts
Armco Iron Culverts & Flume Mfrs. Assn.

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Electric Service Sup. Co.
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Archer & Baldwin
Electric Equipment Co.

Derailing Devices (See also Track Work)
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Electric Service Sup. Co.

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Wish Service, P. Edward

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Williams & Co., J. H.

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Doors and Door Fixtures
Brill Co., The J. G.
General Electric Co.

Doors, Folding Vestibule
Nat'l Pneumatic Co., Inc.

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Arnold Co., The
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Byllesby & Co., H. M.
Clark & Co., Mgr., Corp., E. W.
Day & Zimmermann
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Ford, Bacon & Davis
Gould, L. E.
Hemphill & Wells
Holst, Englehardt W.
Jackson, Walter
Kelly, Cooke & Co.
Parsons, Klapp, Brinkerhoff & Douglas
Richey, Albert S.
Sanderson & Porter
Sangster & Matthews
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They are uniform in quality

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- Anderson Slack Adjusters
- Genesco Paint Oils
- Dunham Hopper Door Device
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- Anglo-American Varnishes, Paints, Enamels, Surfacers, Shop Cleaner
- Johnson Fare Boxes
- Drew Line Material and Railway Specialties
- Perry Side Bearings
- Hartman Centering Center Plates
- Economy Power Saving Meter
- H & W Electric Heaters
- Garland Ventilators
- Pitt Sanders
- National Safety Car Equipment Co's One-Man Safety Cars

Advertisements for the

Searchlight Section

Can be received at the New York Office of Electric Railway Journal until 10 a. m.

Wednesday

For issue out Saturday

0220

POW

Thus, according to Hindu mythology, were the world's towns and cities located:

'Adam and Eve were happy up to the time of the apple-eating episode. After that life was just one thing after another. One night Eve left home just because Adam in happy homebrew frame of mind playfully cuffed her behind the ear with his stone axe. A mere trifle to be sure, but women were touchy even in those days.

'Adam hunted her for thirty days. With his giant stride he covered the length and breadth of the globe and everywhere he set his immense foot (pow) down a town was destined to spring up. On the thirtieth day he returned home and found her sitting on the front step waiting for him, whereupon he joyously blacked both her eyes. Their reunion was a happy one.'

So much for MYTHology—for ALL yarns! When someone tells you he can supply trouble-proof motor brushes without looking into your operating conditions—take it with a grain of salt.

Square pegs won't fit in round holes—let a Morganite engineer *prescribe* brushes to fit your operating conditions!

Morganite Brush Co., Inc.

Main Office and Factory:
519 West 38th Street, New York
DISTRICT ENGINEERS AND AGENTS:

Electric Power Equipment Corp., 13th and Wood Sts., Philadelphia.
Electrical Engineering & Mfg. Co., 909 Penn Ave., Pittsburgh.
R. W. Lillie Corporation, 176 Federal St., Boston, Mass.
W. R. Hendey Co., Hoge Bldg., Seattle.

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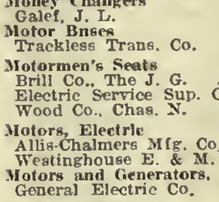

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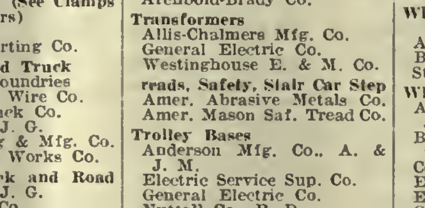

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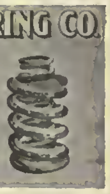

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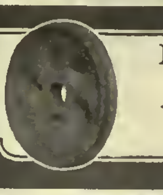

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Boyerized Brake Hangers **Boyerized Wearing Plates**

To get top-notch service from your trucks and brake-rigging, new or old

Boyerize!

Bemis Car Truck Company, Springfield, Mass.

Electric Railway Supplies

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F. F. Bodler, 903 Monadnock Bldg., San Francisco, Cal.
W. F. McKenney, 54 First Street, Portland, Oregon.
A. W. Arlin, 772 Pacific Electric Bldg., Los Angeles, Cal.

—where are the handles for this car?

"Time to pull out—let's go!"

"Oh, Bill! No handles on this car!"

How often are your cars late in getting out because of misplaced controller and air brake handles—someone has borrowed them during the night to move another car and has forgotten to return them.

Controller — Reversing — Airbrake HANDLES

When you need additional handles, let us quote on them. We have large stocks in bronze and malleable iron, or can cast them to your own specifications.

Shop Service for Electric Railways

Handles are only one item on the large list of articles we are ready to furnish from our big shop, devoted almost exclusively to electric railway supplies.

Note the partial list below, and write us for quotations on any special castings, forgings or machine work you may need.

Armature Coils—Motor Parts—Controller Parts
Brake Parts—Gear Cases—Truck Parts
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The Columbia Machine Works and Malleable Iron Co.

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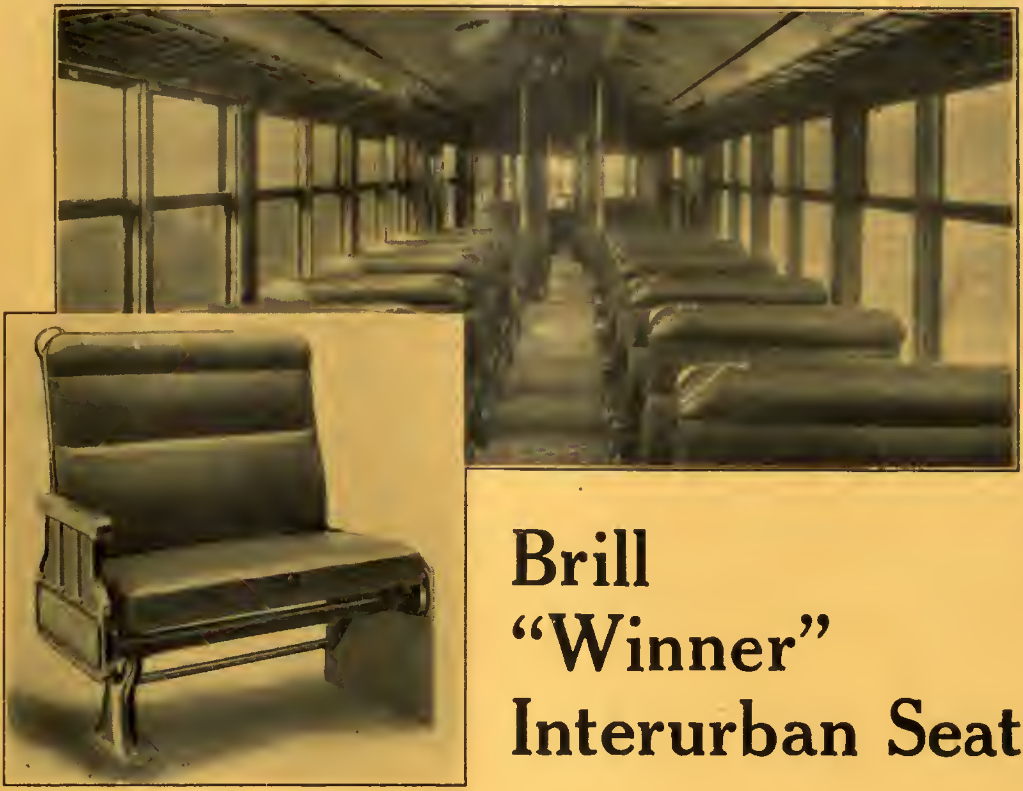
San Francisco, Cal.

Railway & Power Eng. Corporation, 133 Eastern Ave., Toronto, Ont.



Brill "Winner" Interurban Seat

Comfortable seats are an important asset to every successful interurban service.

The Brill "Winner" Interurban Seat is largely responsible in many cases for the popularity of the cars in which it is installed. It is not only most comfortable, but also is characterized by its simplicity, low maintenance, light weight and attractive appearance. The pedestal, wall and aisle plates, and seat rockers are of pressed steel. May be furnished upholstered in leather, twill-woven seating rattan or any other suitable material desired.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

AMERICAN CAR CO. — G. C. KUHLMAN CAR CO. — WASON MANF'G CO.
ST. LOUIS MO. CLEVELAND, OHIO. SPRINGFIELD, MASS.

ASK yourself—"what stands *back* of the Collier Contract guaranteeing over a specified period of years the permanence of the income from my car card space."

An organization of 30 years' growth and prestige.

An organization that *covers the United States,* by fully equipped Collier Service offices.

An organization that is not a mere "clearing house" for contracts, but a large, well organized, well operated nation-wide institution extending a complete service to local and to national advertisers, and to the road operating 6 cars or the property of 600.

It is because of the *magnitude* of the Collier Organization, and its concentration on the one object of keeping satisfied advertisers advertising, that Railway Companies obtain a Collier guaranteed income contract.

Barron G. Collier
INCORPORATED
Candler Bldg., New York

Twenty Cents Per Copy
September 17, 1921
McGraw-Hill Co., Inc.

ELECTRIC RAILWAY JOURNAL

JOHNSON FARE BOXES & METAL TICKETS

—they simplify your Transportation Selling Problem and increase gross revenue 3 to 10%

St. Louis Street Cars of the United Railways Co.
equipped with
JOHNSON FARE BOXES

OHNSON FARE BOX CO.
avenswood Chicago Illinois

"Reconstruction"

Off for the Convention. American Electric Railway Association, Atlantic City, October 3 to 6.

"Joe," said the Vice-President, "our Executive Board has decided, notwithstanding business conditions, that the coming Convention is so extremely important to each company and to the Industry as a whole that all of our executives and heads of important departments must attend and take an active part in all discussions."

"I am very glad to hear that, Boss," answered Joe, "The absence of exhibits this year is, of course, a handicap. On the other hand it will give all of us more time to devote to the meetings, discussions and general exchange of ideas and opinions."

"That's the point, Joe," responded the General Manager, "and after all a general discussion of our problems is far more important at this time than exhibits. You can depend upon the Westinghouse Company and other leading manufacturers to find ways and means to fully inform us on the improvements in apparatus that they have developed during the year."

Westinghouse Electric & Manufacturing Co.

Sales Offices in All Large American Cities

East Pittsburgh, Pa.

Vol. 58, *No.* 12 New York, September 17, 1921 *Pages* 425-462

Electric Railway Journal

Henry W. Blake and Harold V. Bozell, Editors
Henry H. Norris, Managing-Editor

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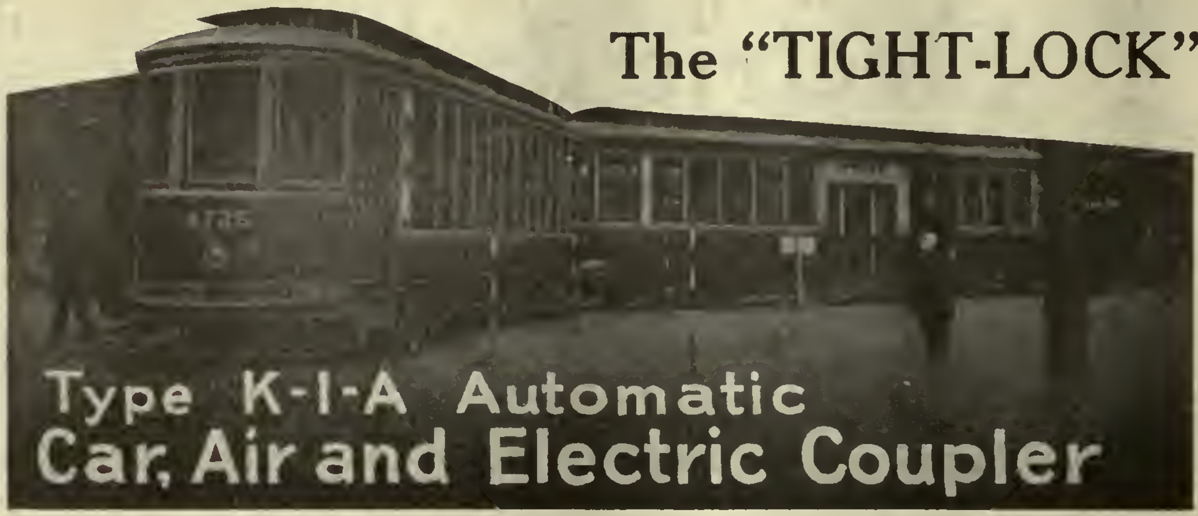
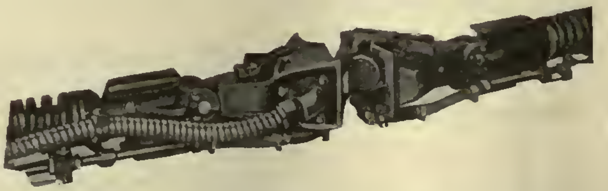
The "TIGHT-LOCK"



For MOTOR and TRAILER OPERATION

TIME is money during rush hour traffic. That is why the Westinghouse K-1-A Automatic Car, Air and Electric Coupler, with the distinctive "tight-lock" feature, appeals to the progressive traction operator who is watching for every opportunity to convert wasted time into revenue.

The K-1-A is particularly adapted for motor and trailer operation, or for multiple motor service. It saves time in making up trains, the impact of one car against the other being all that is necessary to establish car, air and electric connection. And with the famous "tight-lock" grip the couplings remain absolutely rigid at the joint, insuring non-leakable air line and close-fitting electric contacts.



SAFE and ECONOMICAL

ONE of the largest electric railways on the Pacific Coast reported the derailment of a train while running at a high rate of speed, and stated that loss of life undoubtedly would have resulted had it not been for a Westinghouse K-1-A Automatic Coupler which held the train together and prevented one of the cars from rolling down an embankment. The tight-lock feature is generally recognized as an important safety device.

The fact that the coupler is both safe and efficient, preventing accidents and giving long and faithful service, makes it highly desirable from the standpoint of economy. It has established a record for low maintenance.

Free Engineering Advice Furnished on Request

WESTINGHOUSE TRACTION BRAKE CO.

General Office and Works, Wilmerding, Pa.

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HOUSTON, TEX.
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SAN FRANCISCO
ST. LOUIS, MO.
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LOS ANGELES
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Crouse-Hinds Imperial Incandescent Headlights

Any Degree of Light You Need —Reliability Always

On city cars you want a headlight which serves principally as a marker.

In dim suburbs and outlying districts your cars must have more light.

Your interurbans, on private right of way, require a strong, powerful beam.

There are Imperial Incandescents just right for each of these services.

On every car you need a headlight which is rugged, simple, trouble proof. Every Imperial Incandescent meets those requirements.

Besides various styles of Incandescents, several types of Luminous Arc and Carbon Arc Headlights are included in the complete Crouse-Hinds Imperial line.

The Ohio Brass Co., Mansfield, Ohio

Exclusive Sales Agents in the U. S. for Crouse-Hinds Imperial Headlights

New York Philadelphia Pittsburgh
Chicago Los Angeles San Francisco
Paris, France

Manufactures: Trolley Materials; Rail Bonds; Car Equipment; High Tension Porcelain Insulators; Third Rail Insulators.

Thermit Welded Crossings Prove Successful on Lines of Pennsylvania-Ohio Electric Company and Youngstown Municipal Railway

A Thermit Welded Crossing in Fall River, Mass., later installed in street

Extract from an article by Mr. R. R. Lukens, Engineer Ways and Structures, published in the *Pennsylvania-Ohio Electric News:*

"The results achieved in making these Thermit crossings are very commendable. These are the first crossings of this kind made on this property. One is now in service at Federal and Basin Streets, Youngstown; the other is to be installed at the Carbon brick plant on the Youngstown New Castle line.

"This is relatively a new process of making street railway crossings. Five years ago the first frog was made as an experiment to replace a badly broken frog. Since that time a new layout has been installed at the original location and the frog has been in three different layouts of special work and is still in good condition.

"There is a right angle crossing consisting of sixteen frogs made by the Thermit welding process on a line of heavy traffic which has been in service for two years. The crossing is giving good service and from superficial observation it is in first-class condition. So it can readily be seen that crossings of this type are good construction and the company in making an expenditure for such frogs is assured a reasonable return for the money.

"It is self-evident that in case a frog in a crossing fails it can readily be replaced by building one with Thermit welds. Previous to making frogs with Thermit, if a frog failed in a crossing, it was necessary to order one from the manufacturer. This took time and was more expensive than the new process.

"In these days, when street railways are operating at high costs due to the advanced prices of labor and material, it is essential that all the labor-saving devices and economical appliances be developed to the highest degree that is possible to assist in keeping costs down. It seems that such a crossing as has been described above is one of the things that contributes to this end. While it cannot be applied in all instances, it will effect a saving at such places as it can be used."

Send for our
latest Rail Welding Pamphlet 3932.

METAL & THERMIT CORPORATION

Boston
Pittsburgh
Chicago

120 Broadway

SERVICE STRENGTH
THERMIT WELDING
ECONOMY

New York

Toronto
South
San Francisco

Segur Coil Taping Machine being used with other Segur Coil Tools in McCarter Iron Works plant.

The Champion Fibre Co., Canton, N. C., recently began to make their own coils. Photo shows Segur Coil Winding Machine. They are highly satisfied with Segur Tools, stating they are already saving 50% on coil costs.

Segur Coil Spreader shaping coils in the armature repair shop of the McCarter Iron Works, Norristown, Pa.

Take advantage of the copper market and Segur Coil Winding Tools

Are you paying the old high market copper prices like many motor users are doing who are buying factory-made coils? Consult your electrical department foreman and see if you can't set apart some small corner in your shops as an armature repair plant. By installing the Segur line of Coil Winding Tools (Winder, Spreader and Taping Machine) and buying copper wire right away you can save quite an item on motor repairing. Besides you can greatly speed up your armature repairs and keep your men more constantly on productive work. ***Send for Segur Data Sheets.***

ELECTRIC SERVICE SUPPLIES CO.

Manufacturer of Railway Material and Electrical Supplies

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17th and Cambria Streets
Branch Offices: Boston, Scranton, Pittsburgh

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CHCAGO
Monadnock Building

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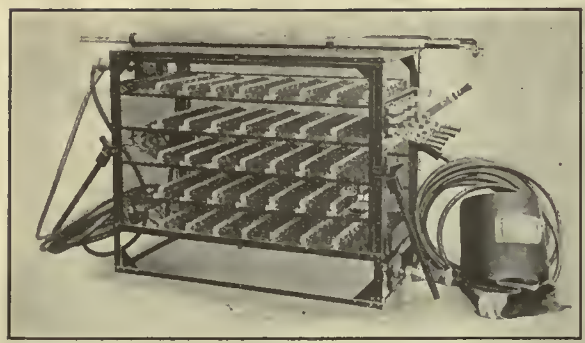
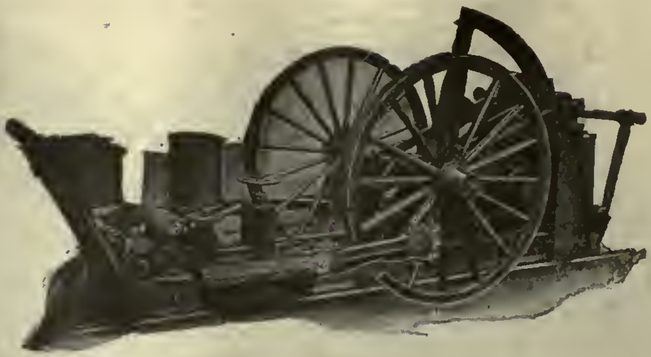
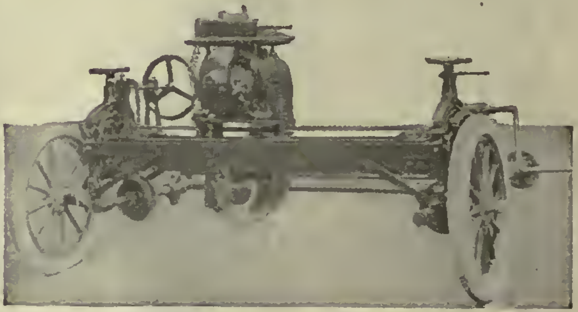




RECIPROCATING Track Grinder

ATLAS Rail Grinder



UNIVERSAL Rotary Track Grinder

For Welding and Grinding

—*A Double Source of Cost Reduction*

Do you realize that at the same time you are prolonging the useful life of track work you can be successfully cutting repair costs on rolling stock?

How?

By putting your track in such smooth-riding condition that it eliminates the pounding and jarring of cars and trucks, so characteristic with run-down track and special work.

The Ajax Electric Arc Welder, together with the Reciprocating and Atlas, or Universal Rail Grinders, form a battery of defense against the ravages of track deterioration. Railway track is most successfully maintained, at lowest cost, by constant attention with welding and grinding in the first stages of wear or corrugation.

RAILWAY TRACK-WORK COMPANY

3132-48 E. Thompson St. Philadelphia, Pa.

Protect the 82%
By Using Steel Twin Ties

82% of the cost of a typical design of concrete track foundation is for items other than ties. Yet the success or failure of the track is largely dependent on the tie used.

Even if the tie selected increases the cost of the construction it is justified to protect the larger part of the investment.

But, with STEEL TWIN TIES, the first cost of the construction is less than with wood ties in concrete.

Protect the 82% and save in first cost, too.

The complete data is sent on request, in a permanent folder. Write *now*.

Steel Twin Tie Track

THE INTERNATIONAL STEEL TIE COMPANY, Cleveland, Ohio

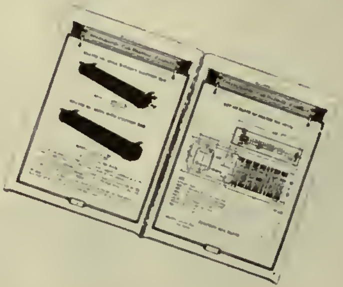
International Steel Twin Ties manufactured and sold in Canada by Sarnia Bridge Co., Ltd., Sarnia, Ont.

Keep Your Winter Cars More Uniformly Warm and Comfortable

by means of

Consolidated Heaters

with Thermostatic Control



Not an Experiment or a Theory But an Economic Necessity

Car Comfort is probably appreciated by your patrons fully as much, if not more, than fast schedules and short headways. People will not patronize cold cars if there is any way to avoid them. Even walking considerable distances in cold weather often seems preferable to riding in frigid discomfort.

Consolidated Heaters will furnish ample and satisfying warmth. They are efficient in operation and economical to maintain.

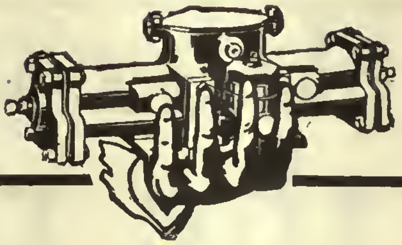
With automatically-acting Consolidated Thermostatic Control, a comfortably uniform car temperature will be maintained. Instead of overheating the car at times, with consequent waste of power, the thermostat automatically cuts off the current when a predetermined temperature is reached. Then when it drops, the heat comes on again without attention from trainmen.

Current consumption is limited to just the bare amount needed to do the work, no more. Write us for quotations on an installation for you.

Consolidated Car Heating Co.

Albany New York Chicago

Modernize!



Pneumatize!

"Figure yourself", as the Frenchman says, the natural deductions from the following situation:

The electric railway prospect of today has his house cleaned with a motor-operated vacuum cleaner; his clothes washed and laundered by electrical machinery; his phonograph wound up by a motor; his bread toasted by electricity almost instantaneously while his coffee may have come out of a motor-driven grinder. Then his wife whisks him to the station in an automobile fitted with a self-starter.

Just what will be his impression, then, if the cars of the *electric* street railway in town are run on the same hand-pull and hand-signal basis as in the days when there were no such labor-saving appliances as those named?

To put "1921" pep into "1900" cars, confer with us on the application of

National Pneumatic

Door and Step Control
Door and Step Operating Mechanisms
Motorman's Signal Lights
Safety Interlocking Door Control
Multiple Unit Door Control

Manufactured in Canada by
Dominion Wheel & Foundries, Ltd.
Toronto, Ont.

National Pneumatic Company, Inc.

50 Church St., New York
Edison Bldg., Chicago
Works: Rahway, N. J.

Don't bury hard-
along the right of

That's just what you do when you say "good-bye" to *6000 Extra Dollars* for every mile of track laid on wood ties in concrete—

Accurate cost figures on hundreds of track-laying jobs throughout the country offer incontrovertible proof that Dayton Resilient Ties actually save $6000 per mile over track laid on wood ties in concrete foundations and $2000 per mile over track laid on wood ties in gravel ballast.

In the face of these proven facts can you afford to continue to bury $2000 to $6000 hard earned dollars along every mile of new track laid by your company? Isn't it up to you to turn these extra thousands into the treasurer's office rather than into the road bed?

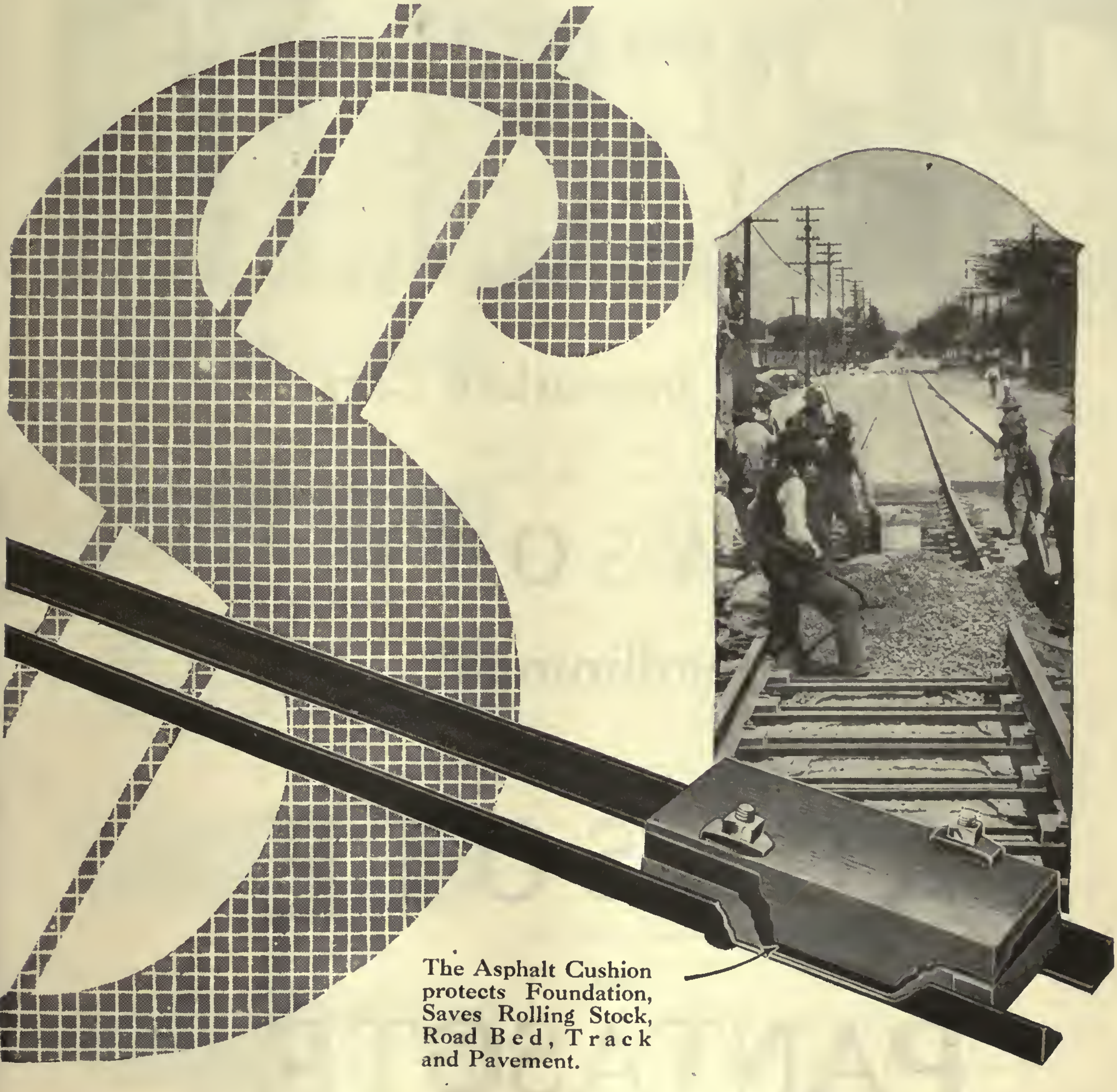
In addition to these remarkable savings in track-laying costs, Dayton Resilient Ties insure longer life to track and paving—they reduce to a minimum both track and paving repairs—they reduce traffic noise and upkeep of rolling stock by cushioning the shocks and jars that can not be prevented on foundations that lack resiliency.

But get *all* the facts on Dayton Resilient Ties. A two-cent stamp *now* may save you thousands of dollars next month or next year. The coupon on the opposite page is for your convenience. Simply hand it to your stenographer with instructions to mail today.

The Dayton Mechanical Tie Company
706 Commercial Bldg., Dayton, Ohio

DAYTON

earned dollars way



The Asphalt Cushion protects Foundation, Saves Rolling Stock, Road Bed, Track and Pavement.

Resilient TIE

PIN TO LETTER

Dayton Mechanical Tie Company
706 Commercial Bldg., Dayton, Ohio

Without obligation please send me full information about your Dayton Resilient Ties.

The New Interurban Cars

of the Philadelphia and West Chester Traction Company—ten of them in all—have

AGASOTE

(TRADE-MARK)

Headlinings

For your own car roofs, ceilings and wainscoting, specify

AGASOTE

(TRADE-MARK)

and

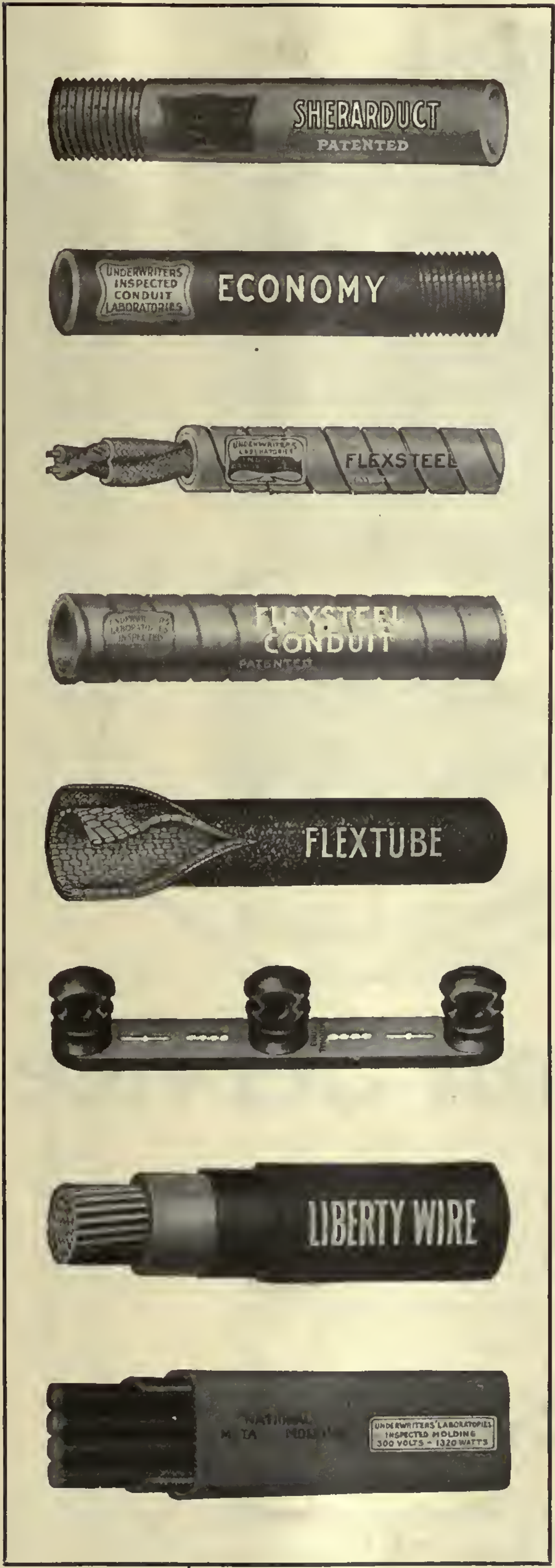
PANTASOTE

(TRADE-MARK)

for your car curtains and upholstery.

THE PANTASOTE COMPANY, 11 Broadway, New York

People's Gas Bldg., Chicago, Ill.
751 Monadnock Bldg., San Francisco, Cal.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UNDERWRITERS INSPECTED CONDUIT LABORATORIES
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LIBERTY WIRE
NATIONAL METAL MOULDING
UNDERWRITERS LABORATORIES INSPECTED MOLDING 300 VOLTS - 1320 WATTS

Specify

NATIONAL PRODUCTS

for every electric wiring job!

CAR wiring, as well as wiring in power plants, substations and shops, can be done more quickly, more economically and more satisfactorily if the entire order for wiring materials, conduit,—either rigid or flexible,—outlet boxes, switch boxes, flexible cable and fittings reads "National Products" sold thru Electrical Jobbers.

Send for Catalogues

"All you require
When you wire"

National Metal Moulding Co.

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Atlanta
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Philadelphia
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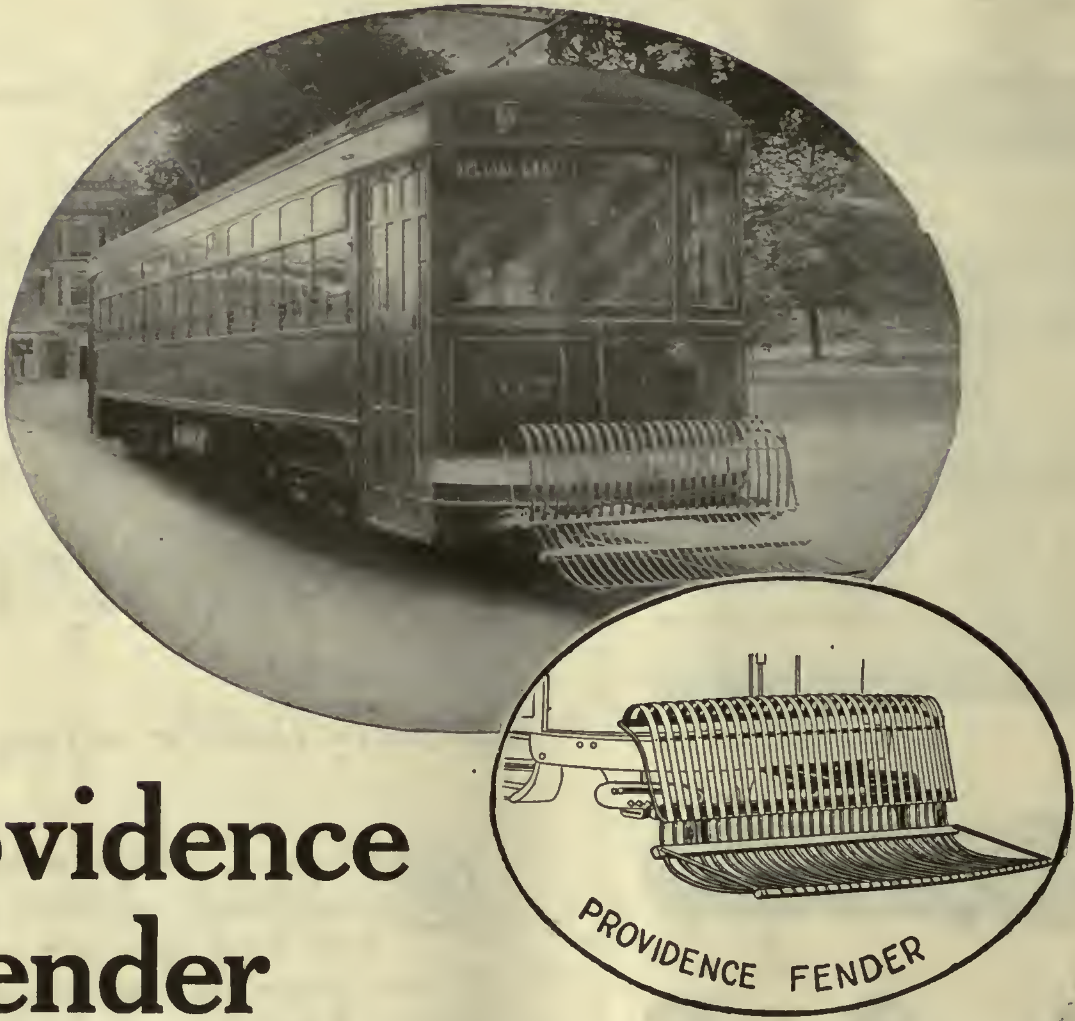


Providence Fender For Suburban Service

Used very generally on medium and high-speed suburban lines, especially when there is much open track or very rough pavement to operate over. Can be set to clear any necessary height, and be instantly released by the motorman when there is danger of striking any person on the track.

Providence Fender is the leading fender for this class of service, just as our H-B LIFE GUARD is pre-eminent in the field of city service.

The Consolidated Car Fender Co.
Providence, R. I.

General Sales Agent:
Wendell & MacDuffie Co.
61 Broadway, N. Y.

The World's best Lubricants

GALENA QUALITY

Performance—the proving ground of service

It does not require engineering statistics to convince the practical mechanical man that ordinary oils cannot fulfill the requirements of railway service.

There is one, and only one, reliable test of the ability of lubricants—that of performance in actual service. It is this conclusive test of merit that has caused *Galena Oils* to be specified by the great majority of America's electric railways—they have done and are doing the work with an efficiency and economy that deserves and demands such preference.

It is the implicit confidence in the ability of Galena Oils—built upon the foundation of many years of unvarying, faithful performance—that enables this company to *guarantee* the delivery of lubrication service as specified by contract.

With less confidence in the quality or uniformity of a product, it is quite natural that such guarantee of performance cannot be made. Hoping to make good and *guaranteeing* to make good are two quite different propositions.

The unanswerable argument for Galena Oil quality must lie in the fact that they are the only railway lubricants that are absolutely guaranteed to perform specified service, the failure of the lower grade oils to give like service—after many trials—emphasizing by contrast the conspicuous merit of Galena products.

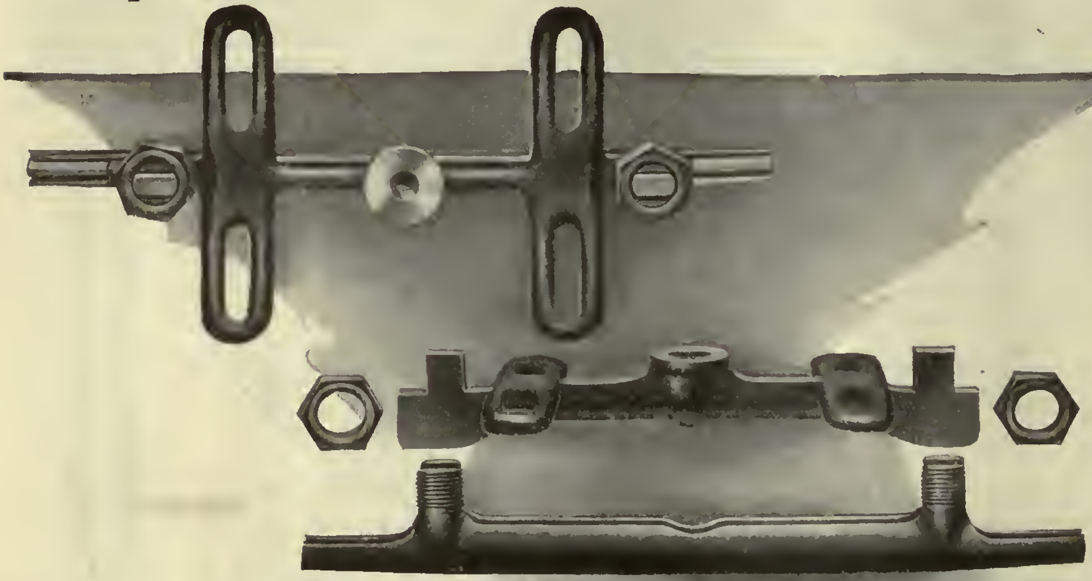
Galena Quality Is Our Bond
and Your Security!

TRIGRAM G S O C TRADE MARK

THE GALENA-SIGNAL OIL CO.
NEW YORK FRANKLIN, PA. CHICAGO
Offices in all principal American Cities
LONDON BUENOS AIRES PARIS

GALENA SERVICE

Strong line material bearing the name of a reliable maker relieves street railways of much trouble and expense



Form S Strain Ear

Big Savings In these little devices

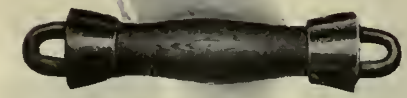
THE strength of G-E Form S Strain Ears is a bulwark for trolley "overhead." But the value of these Ears is not limited to their strength. The shoes are detachable and can be renewed without disconnecting the bodies from the wire. Sherardizing makes their weather-resistance high.

Form S Strain Ears, mounted on the line at intervals to maintain uniform tension and prevent "creeping" are designed so that they cannot pocket a wild trolley. These Ears save money not only on first cost but continuously by their low upkeep.

G-E Strain Insulators of many types—moulded compound, solid porcelain, and wood—are made for every service. For downright worth they are unexcelled.

Moulded Compound Strain Insulator

Solid Porcelain Strain Insulator



Wood Strain Insulator

General Electric Company

General Office
Schenectady, N.Y.

Sales Offices in
all large cities

40-133

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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Jim Burleson an Example

DANIEL in the lion's den had an easy job compared to that of Jim Burleson, as narrated by H. A. Lemmon in this issue. It is a little epic of how a street car conductor, through the power of his personality, tamed the Mexicans at the apex of their anti-gringo feeling, merely as a part of his day's job. "Human nature" is probably the only reason to assign for the fact that only death and the funeral procession brought recognition of his work.

Unheralded and unsung, it is the Jim Burlesons that really can solve the question of "public relations" in the railway industry and cause the expression to be forgotten as a problem. In no other public utility is there so much contact between employees and the public, but this powerful agency is but little used by railway managements. Publicity with personality is a necessity and the educated crew is the agency to obtain it. Let us have more recognition and use for the Jim Burlesons as transportation salesmen.

The Silver Tongue and the Transportation Superintendent

IN ADDITION to the other qualities which are necessary or desirable in a superintendent of transportation, that of being able to deliver a lucid public address should not be overlooked. A "good talker" is especially needed in this position because he has to solve the problem of inspiring the platform men and supervisors with the real spirit of service and salesmanship. He needs to discuss with the men, sometimes in large numbers, the delicate question of wages and working conditions. He is the intermediary between the management and the largest group of employees. And quite frequently he has an opportunity to address organizations of citizens, which he should be prepared and eager to do. The superintendent has a wonderful opportunity. If his men and the public are convinced of his sincerity and know that his words do not outrun his deeds, he will always be a welcome speaker at gatherings of employees and others. If he is not, something is wrong.

A good talker is not necessarily one who comes within the class of "spellbinder," but is rather the speaker who is in sympathy with his audience, has a real message which this audience wants or needs, has a reasonable command of the English language and is willing to forget himself. The electric railway business does not offer many opportunities for the display of elocutionary or oratorical talent. However, here as in all other fields of human endeavor, the man who can think on his feet and express himself clearly has the advantage over the diffident man, everything else being equal. It must be granted that everything else is not always equal, because the reserved man is apt to be one who thinks more deeply than another who is more loquacious. This does not vitiate the statement, however, that the clear thinker who expresses himself forcibly and trenchantly has the advantage in getting his ideas over. Young men who are training for ultimate superintendencies ought not to neglect this side of their education.

Your Problems Are Not Unique— Come and Discuss Them with Others

IF THERE was ever a time in the history of the American Electric Railway Association when intimate counsel and discussion between the various electric railway men was necessary and valuable it is at present. Engrossed perhaps in the detailed problems of his individual property, each railway man is apt to regard his own problems as unique, but fundamentally they are the same as those faced by other railway men, and there is no one but can both give and gain something valuable at the convention which is to be held at Atlantic City.

Some have indicated that the absence of exhibits would detract so much from the convention that their attendance was doubtful. But while that particular feature of the convention will be missing, it will give both cause and opportunity for every one to devote himself more assiduously to gaining benefit from the sessions of the parent and its affiliated associations.

The industry today is on the mend. But this fact does not remove the other fact that it is still in a critical condition and needs and deserves the leadership which can develop and grow as a result of constructive discussion of its problems.

There are at least four major problems today. One of these is that of the trackless transportation, and there can be no definite conclusion reached at this early stage either on the attitude of the public or on the technical or economic factors themselves, as compared with railway transportation. Another problem is the public's attitude with reference to municipal ownership or to partnership with railways. This emphasizes today the question of public relations and franchises. Another problem is the financial one, by which is meant that of adjusting the financial structure to meet both the best business practice and best public policy of today. This point has already been emphasized by the Federal Electric Railways Commission and later by President Gadsden in the suggestion of making the nominal capitalization equal the valuation. A fourth and equally important subject is the labor situation, not only as it has presented itself in the past from the standpoint of wages, agreements, and dickering with unions, but the more constructive question of how best to place railway labor on the plane of skilled labor, so that trainmen at least will have more of the transportation business or sales attitude.

Certainly with problems such as these confronting the industry there is plenty to talk about at Atlantic City. The program as arranged touches most of these subjects as well as others and provides ample time for discussion. In addition, the mechanism of the association is being better fitted to the times and the advice and counsel of every man active in the business are needed in this work. The best constitution and association organization should result.

What is needed is a rousing attendance of enthusiastic railway men at Atlantic City from Oct. 3 to Oct. 6. If you have not already done so, make your plans to come.

Seats per Passenger as a Traffic Unit

THE point was made in an editorial in the issue of Sept. 3 that the expressions "Revenue passengers per car-mile," "total passengers per car-mile" and "seats per passenger carried," if used as indexes of traffic density, are apt to be misleading when applied to properties operating under different conditions. Examples were given to prove this contention, particularly how well-filled cars during the off-peak hours would have the same effect on increasing the ratio between passengers and car-miles as if these added passengers came during the rush hours. Since the publication of that editorial a correspondent has expressed the belief that some estimates made in the editorial for the average value of the unit "seats per passenger" are too low. The figure given was from one and one-half to two seats per passenger, when taken on an all-day operating basis, and 0.75 seats per passenger during the rush hours.

Unfortunately, statistics in regard to this ratio, if it is obtained by dividing the seat-miles by the passenger-miles, are very meager. The practice of keeping a record of the seat-miles operated, though comparatively new, is now followed by some electric railway properties, but it is obvious that the passenger-miles on a property having a flat-fare system can be obtained only by a special traffic count, which of course is expensive and applies only to the period of observation. Some figures from traffic counts indicate that the ratio mentioned above has been observed, but others, including some quoted by the correspondent, give a ratio between seat-miles and passenger-miles of from 2 to 2½ for an all-day average, and these are probably in the majority.

Fortunately, so far as the practical application of this index to a single property is concerned, a manager does not have to depend on "passenger-miles," a figure useful but difficult to obtain. Instead of the ratio between "seat-miles" and "passenger-miles" he can use the ratio between "seat-trips" and "passenger-trips," the former being easily calculated on any property where "seat-miles" are kept and the latter being simply the passengers carried. The ratio thus obtained will help a manager to determine whether a company is becoming more economical in seat operation from time to time. Obviously where "trips" are used instead of miles, the comparison is upset if there is any material change in the length of the average trip. For this reason a comparison on this basis between two properties is of no value, because the runs may be much longer on one property than on the other. But on individual properties, where the runs are of the same length or approximately so from one year to another, this difference cancels itself. The aim of the manager should be to reduce the ratio of seats per passenger without crowding the cars.

Welding the Scrap Pile

"WE DON'T have a scrap pile any more, we are too poor to buy anything, so we weld and continue to weld and use everything so long as it will be good for anything." The foregoing is a typical remark by shop foremen and it reflects a creditable condition if it results in real saving, but——

Too frequently the welds break next day or next week, too frequently damage to a welded scrap pile occurs due to small jars, too frequently service tie-ups occur which result in bad schedule mix-ups and irritated passengers, too frequently the labor and material cost involved in repairing junk apparatus for a few days' service results in spending instead of saving.

Only an adequate cost-accounting system in street railway shops and adequate service records will determine when to add to or take from the scrap pile. Guesswork is out of place in the railway business and repair operations should be carefully weighed on an economic basis. Of course the workmen take a kind of pride in doing a repair job that is difficult and in keeping an old cripple still in service, but the item of cost must not be neglected or the result will be false economy. Accurate cost analyses and a good cost-accounting system are the reliable methods to obtain real savings. Another element in the business is the effect on merchandising. It does not seem good business to take chances in service or to leave decrepit equipment operating on the streets. There is more to the railway business than merely economizing in production costs. It pays to advertise and to take no chances with public sentiment.

Machines Save Money in the Shops

SHOP labor used to be cheap—it isn't now. Shop machines used to be designed for low-speed carbon tools—they aren't now. "It is the war" as usual that caused the changes, but the question is, how many shops have taken advantage of new knowledge, machines and tools to save money? Every job takes labor, time and money, and the use of modern high-speed tool steels in modern machines equipped with new devices such as self-centering or magnetic chucks will save all three elements.

The old machines in the shop will not stand the stresses resulting from the use of high-speed tool steels and fast-cutting speeds. The old machines and tools formed the basis for railway shop speed and practice, and it may be that even the war, with its reaction on shop work in other industries, never caused a quiver in many railway shops.

It might pay shop foremen to look around in some reorganized industrial shops and investigate modern practice and machinery to see if the junking of some of the old equipment, tools and methods in their shops in favor of the new would not result in saving money, time and labor on every shop job. It is up to the foremen to show the railway executives how to save money in the shops by taking advantage of present knowledge and equipment, because the executives, too frequently, can see only the requisition for the expenditure of the initial money for the machinery. Some remarkable economies can be obtained by the use of modern equipment and railway foremen should keep posted.

Testing Railway Motor Detail Parts

All Operations of Manufacture Must Be Carefully Worked Out and Every Detail Must Be Followed Closely to Insure that All May Perform Correctly When They Are Assembled in the Completed Motor

By John S. Dean
Railway Motor Engineering Department, Westinghouse Electric & Manufacturing Company

> In three preceding articles which appeared in the **ELECTRIC RAILWAY JOURNAL**, under the titles "Testing Metals and Alloys" (Aug. 16, 1919) and "Testing of Insulating Materials" (May 21 and July 16, 1921), the author described the methods used in selecting and testing various raw materials that enter into the make-up of the detail parts of a railway motor. In the building of these detail parts it is not only essential to have approved materials which measure up to the test requirements, but in addition it is of vital importance that the various operations during the process of manufacturing be carefully worked out and followed in every detail to insure that each part will measure up to its requirements and correctly perform its function when assembled in the completed motor.

To aid the shop in its work and to provide against failure of motor detail parts, process specifications are prepared covering the most important manufacturing operations and these approved methods are carefully followed throughout the factory. These specifications are the result of experimental and research work, field investigation and study, and a number of years of experience.

In the manufacture of a railway motor all detail parts that enter into its construction are built up complete in the various feeder sections of the shop, and are sent to the assembling department to be put together. This method of manufacturing under conditions of high specialization has a number of advantages, such as: (1) Experienced supervision; (2) skilled and trained labor; (3) specially designed tools, jigs and fixtures; (4) maximum production; (5) minimum costs; (6) large output; (7) improved product.

On the other hand, this method of manufacturing demands that all of these detail parts be very accurately made and carefully checked and tested in order that they can be readily assembled into a completed motor with the least possible expenditure of time and labor. For this reason all of these parts before being sent out from the various feeder sections in which they are made receive a very thorough inspection and test to insure that they measure up to a certain predetermined fixed standard both mechanically and electrically.

The most important tests, which will be described in detail later on, are given in the table on page 430, which shows to what extent all possible precautions are taken to eliminate defects and to insure reliable detail parts in the production of a rugged and dependable railway motor.

Experience has shown that the armature fans, which are made of malleable iron or cast steel and are of comparatively large diameter, are quite frequently out of balance. This is due to certain of the unmachined sections being cast heavier in various parts of the fan. To correct this trouble, which would cause the finished armature to be out of balance, all fans after final machining are pressed on an arbor and given a static balance test. This balancing is done either by chipping away the heavy sections or by welding additional metal to the light sections of the fan.

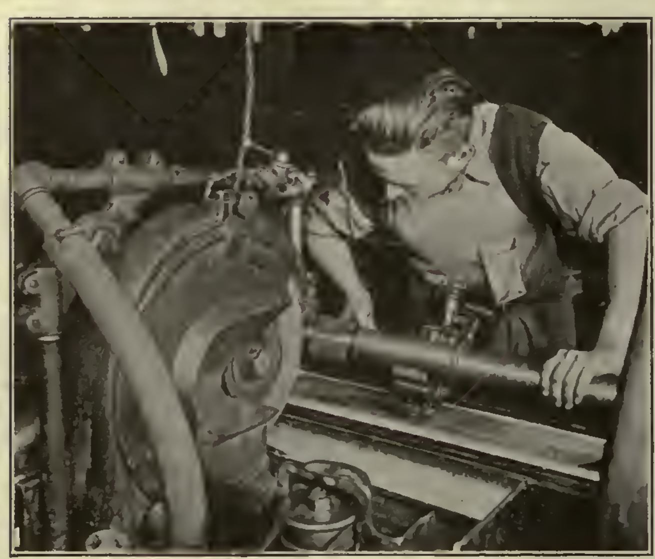
All shafts have the fits for bearings, spiders or laminations, and for the pinion, ground to exact size on a Norton motor-driven grinding machine. The straight fits for bearings, spider, etc., are gaged, using a micrometer, while the taper fit for the pinion is checked by means of a special tapered gage so designed that it can be used without removing the shaft from the centers of the grinding machine. This operation is shown in one of the accompanying illustrations. This method of machining and testing these fits produces a shaft with very accurate and reliable fitting surfaces.

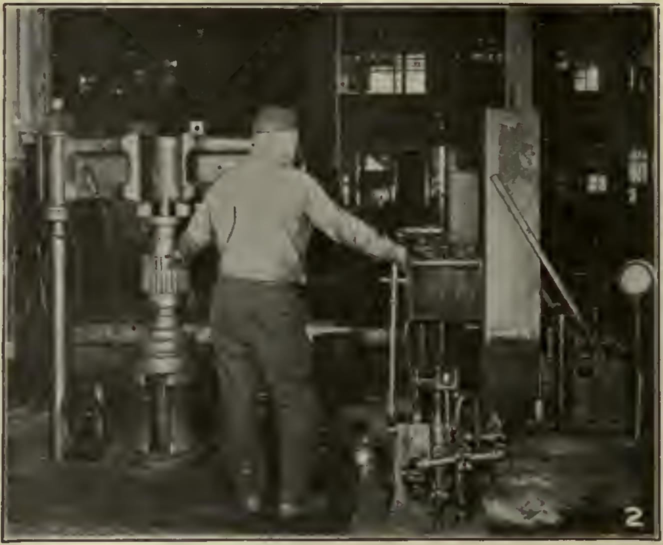
Laminations Made to Driving Fit

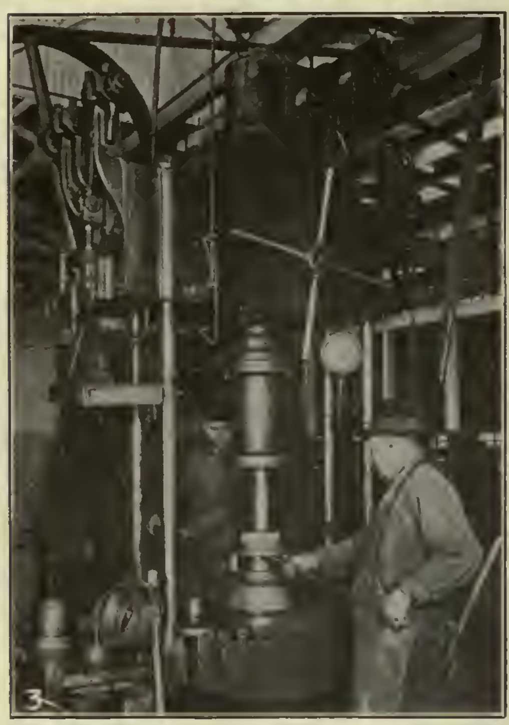
The armature laminations are either built up directly on the shaft or assembled on a spider. In either case the spider or shaft is machined from 0.002 in. to 0.004 in. oversize to secure a tight driving fit of the laminations, thus holding them securely and preventing loose iron in service. These laminations are put in place by hand and forced down by means of a special hydraulic ram. After the end plate has been driven on, the core is pressed and securely locked under a heavy tonnage. The tonnage used for this operation varies with the size of the machine. For a 25-hp. motor, pressures used are from approximately 30 to 40 tons. This operation insures a core which is tight and free from vibration in service.

In the case of an armature where the laminations are built up on a spider, the shaft is pressed in the core after these laminations are assembled, pressed and clamped on the spider as a unit. This operation is done on a 150-ton horizontal type hydraulic press. When a key is used, the pressure required on a 40-hp. motor is from 40 to 50 tons. On motors of larger size, and where the key is omitted from the shaft, they are put in using pressures ranging from 60 to 90 tons.

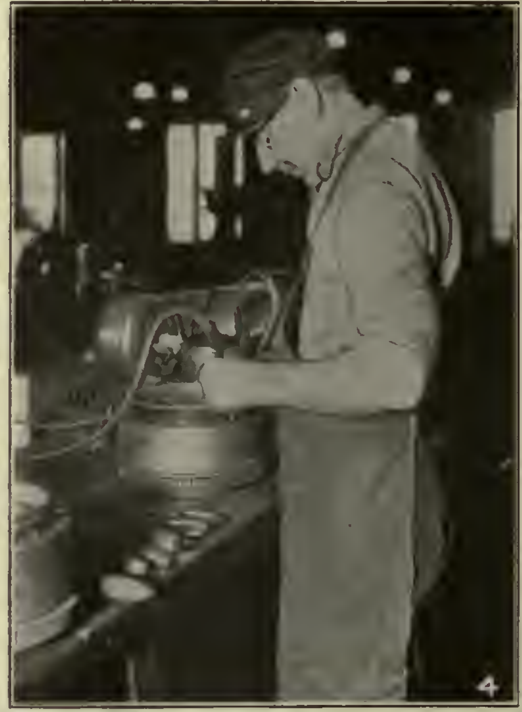
The core when completed, with shaft pressed in, and before the commutator and the windings are put in place, is given a static balance by placing it on two hardened steel parallel bars. The balancing is done by pouring hot metal in the balancing pockets which are opened up on the light side of the core. These pockets, which are distributed around under the surface of the commutator end coil support, are opened up for use by drilling holes into them. This test is necessary to

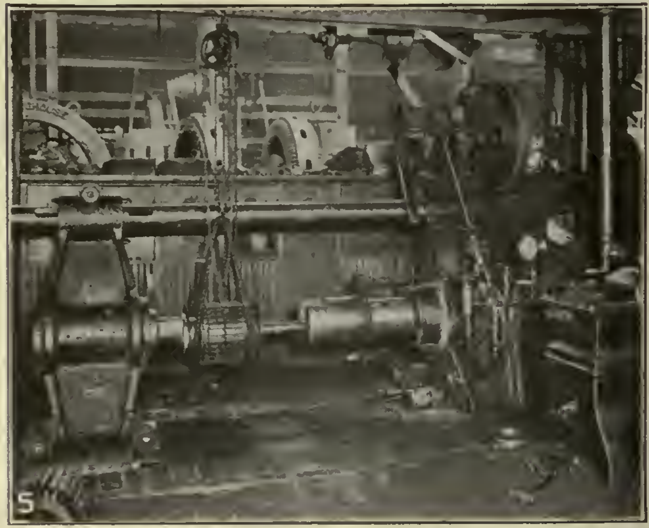


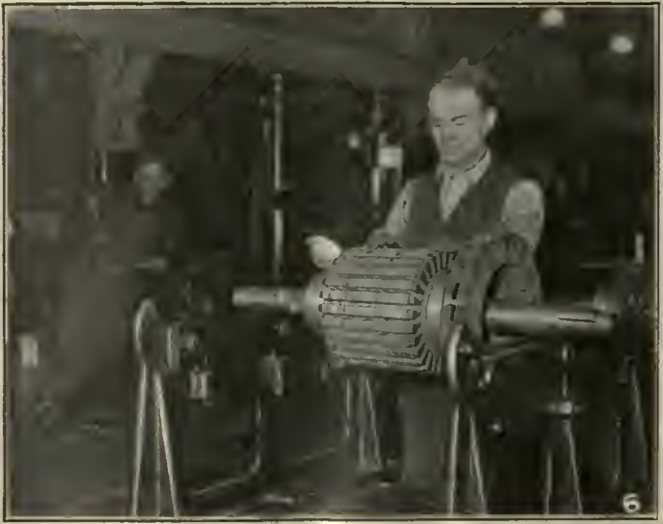




Accurate Machining and Testing of Detail Motor Parts Are Necessary to Insure Efficient Service to the User







No. 1—Grinding and Gaging Pinion Fits on Armature Shafts.

No. 2—Pressing Assembled Laminations on Cores, Using 100-Ton Hydraulic Press.

No. 3—Pressing and Tightening Commutators, Using 100-Ton Hydraulic Press.

No. 4—Short-Circuit Test on Commutators.

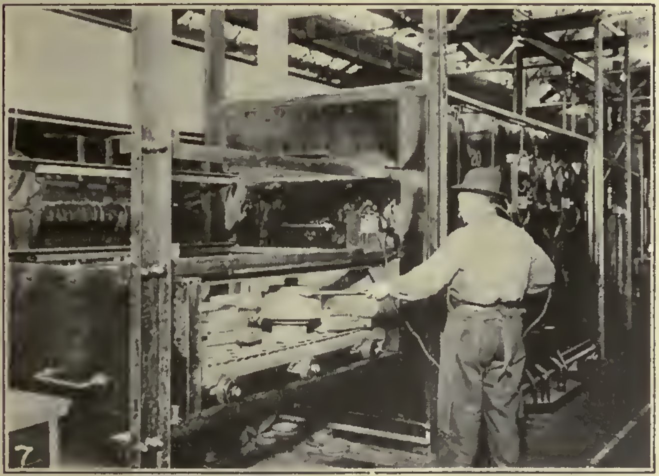
No. 5—Pressing Shafts in Armature Cores, Using 150-Ton Hydraulic Press.

No. 6—Static Balancing of Assembled Armature Cores Prevents Failures in Service.

secure a well-balanced armature and to prevent pounding and vibration of the armature which rapidly deteriorates the bearings of a motor.

COMMUTATOR BUILDING TESTS ARE VERY IMPORTANT

In the construction of the commutator, great care is taken to select clean-cut segments free from sharp edges and fins. These segments after being bright dipped are assembled in special clamps and the V's are machined, after which they are given a 500-volt test between bars for short circuits. In all machining operations it is essential to use tools which are correctly ground to prevent the dragging over of the copper and the short circuiting of adjacent segments. The built-up segments are assembled on the bushing, and during this operation it is very important to keep all parts clean and free from moisture in order to prevent bars from short circuiting. To check for defects that may develop during the building process the commutator again receives a short circuit test of 500 volts alternating current momentarily between all adjacent individual bars. After this test a ground test of 5,000 volts is applied momentarily.



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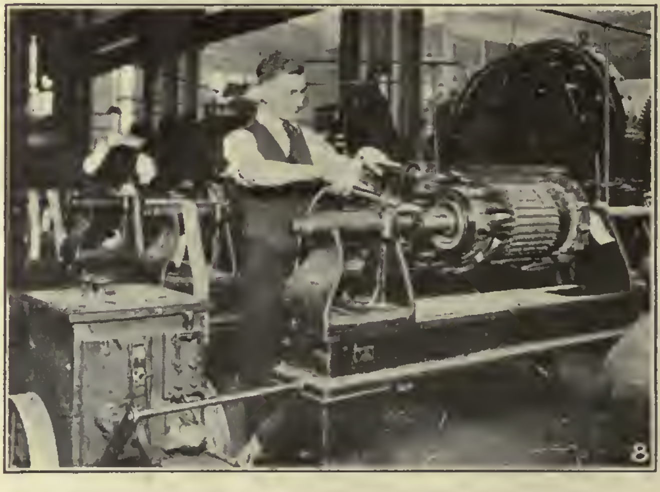
No. 7—TEMPERATURE TEST ON COMMUTATORS BEFORE PRESSING AND TIGHTENING

If the commutator passes the above tests satisfactorily, it is put in an oven and baked for several hours at a maximum temperature of 150 deg. C. The outfit used for this purpose consists of an electrically heated oven with automatic thermostatic control so adjusted as not to exceed the required maximum temperature. The commutators when removed from this oven prior to being pressed are checked by means of a pyrometer to make sure that all parts are at the correct temperature for pressing. It is then placed in a 100-ton press and while under pressure (ranging from 20 to 25 tons for a 40-hp. motor) the clamping ring is drawn up tight. This procedure makes the built-up mica flexible and permits of all metal parts being drawn up in place securely, thus producing a compact commutator that will not allow shifting of the segments in service. After pressing, the completed commutator receives a final test of 300 volts alternating current between bars and a final ground test of 5,000 volts.

MOUNTING COMMUTATORS ON SHAFT

When the commutators are received in the winding department they have the sharp corners of the slots in the necks carefully rounded so as to eliminate all sharp edges that might tend to start breaks in the armature windings directly back of the commutator neck. The mica at the front "V" is protected with insulating material which receives a special treatment of varnish before baking. The commutators are then placed on the assembled core which is mounted in a 60-ton hydraulic press and forced in place, using a pressure of from 10 to 12 tons in the case of a 40-hp. motor.

After being wound in metal-reinforced molds and partly insulated the armature coils are heated in an oven and while hot pressed to a definite size. They are then taped, dipped in a high-grade insulating varnish and baked. The dipping and baking are repeated, after which insulating cells are placed on the straight parts of the coil and taped. The complete insulated coils are then dipped and baked twice. The finished coils are checked and tested between individual conductors for short circuits at 600 volts alternating current momentarily, using a bench type testing box.



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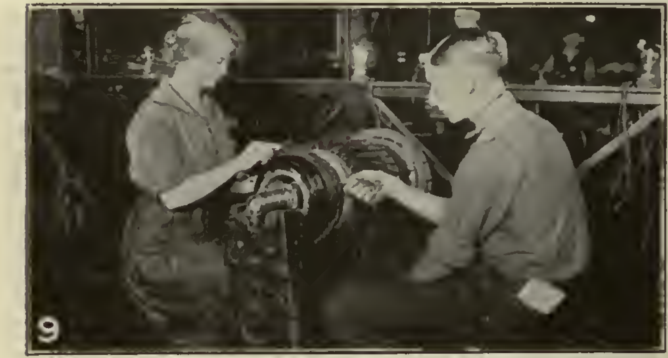
No. 8—TESTING PARTLY-WOUND ARMATURES FOR GROUNDS WITH PORTABLE TESTING BOX

The assembled core of the armature, after being insulated at the front and rear coil supports and before starting to wind, has its commutator tested for grounds using 4,800 volts alternating current. The core is then laid off by the demonstrator and the location of the starting coil in the slots and the location of the starting leads on the commutator are carefully marked for the winder's information. The coils are then placed in the slots and the bottom leads are connected to the commutator, after which the windings and commutator are again tested for grounds at 4,800 volts alternating current using a portable testing box. If the armature passes the above test it is turned over to the connecting department where the windings are carefully lighted out, using a 110-volt lighting out line. All leads are checked and the unconnected top leads are arranged in logical order for connecting. When this test is completed the top leads are connected in the commutator in the order as arranged during the lighting out test, which should give the correct winding connections. As a final check on these connections the completely wound and connected armature is tested for short circuits, open circuits and cross connections, using a portable armature testing yoke such as shown in one of the illustrations. The armature is then given a ground test at 4,400 volts alternating current, after which it is ready to be soldered in the machine which is shown on page 430.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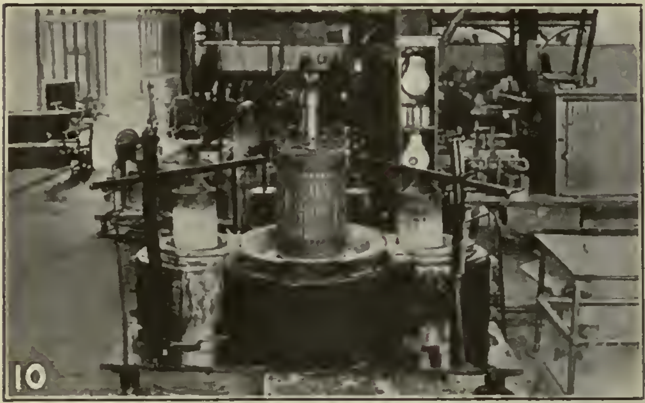
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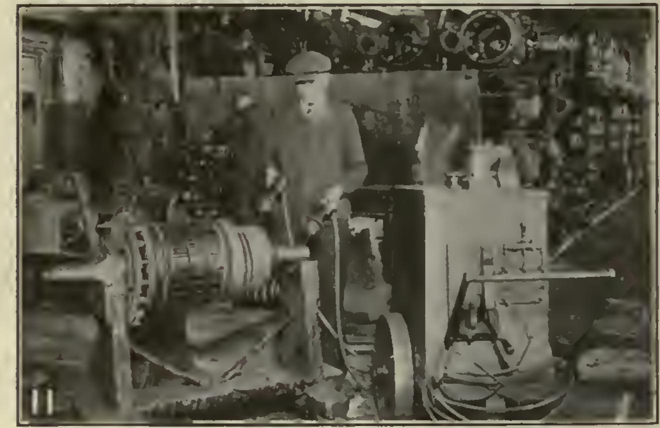
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ARMATURE CONNECTIONS AND COMMUTATORS RECEIVE ATTENTION

No. 9—Lighting Out Armature Connections.
No. 10—Machine for Soldering Armatures—Test Soldering Pot Equipped with Automatic Temperature Control.
No. 11—Using a Portable Testing Box to Test a Complete Armature for Grounds.
No. 12—Testing a Complete Armature for Short Circuits.

After the armature has been wound and all leads driven into the commutator neck, these connections are brushed with a non-acid flux made from alcohol and rosin and the armature is placed in a vertical position commutator end down in the soldering pot, and the hot metal is forced to flow around these connections by forcing two plungers down into the auxiliary pots containing the molten solder. It requires about two minutes' contact to make a good soldered job of all connections, after which the plungers are raised and the solder flows back into the pots. This method of soldering makes a thorough job and prevents any excess solder getting back of the commutator neck, which would very likely cause a short circuit in the windings. During this operation the temperature of the solder in the pots is kept at 450 deg. C. by means of an automatic temperature controlling device attached to the soldering pots.

All newly-wound armatures, after being soldered and temporarily banded, are heated in an oven for twelve hours at a temperature ranging from 95 to 105 deg. C. thoroughly to dry out and drive off all moisture. While hot they are dipped in a high grade of baking insulating varnish—"Amber Insulator"—for about five minutes, then allowed to drain for about fifteen minutes, after which they are placed in an oven equipped with automatic temperature control and baked for forty-eight hours at a temperature ranging from 95 to 105 deg. C. The time of drying out and baking varies with the size of the armature; the above values apply to an armature for a 40-hp. motor. Experience has shown that this treatment greatly increases the life of the winding and adds to the ruggedness of the armature as it (1) seals up any insulation cracked during the winding, (2) keeps out the moisture, (3) tightens the coils in the slot, and (4) insures that all winding material has been treated.

TESTS ON RAILWAY MOTOR DETAIL PARTS

Armature Details	Fans	After final machining		Static balance
	Shafts	Grinding		Gaging fits
	Core	Clamping laminations		Tonnage
		Pressing in shaft		Tonnage
		Assembled core		Static balance
	Commutator	Assembly	Building tests	Short circuit Ground
			Baking and clamping	Temperature Tonnage
		Final test		Short circuit Ground
	Coils	Final test		Short circuit
	Assembly	Mounting commutator on shaft or spider		Tonnage
		Winding and connections	Commutator test	Short circuit Grounds
			Winding and commutator	Ground
			Connections	Lighting out
			Winding and commutator	Short circuit Open circuit Ground
		Soldering-pot, soldering		Temperature
		Dipping and baking		Temperature
		Banding		Tension
*Final testing of complete armatures				Short circuit Open circuit Grounds Bar to bar
Frame Details	Brushholder			Gage carbon box Spring tension Ground
	Brushholder support			Pulling test Ground
	Bearings	Babbitting		Temperature
		Pressing in housing		Tonnage
	Housings and axle cap			Leaks in oil wells
	Field coils			Short circuit Open circuit
	Dipping and baking assembled frame			*Temperature
Final testing of completed frame				Polarity test* Ground

* These operations and tests are not made commercially on all machin

Armatures after being dipped and baked are heated in an oven to a temperature of 90 deg. C. and while hot are banded in a specially-designed motor-driven banding lathe fitted with an adjustable tension device to regulate the pull on the wire while banding. Armatures for 40-hp. motors are banded with a high-grade tinned steel piano wire No. 14 B & S gage put on at a tension of 200 lb.

FINAL TEST OF COMPLETE ARMATURE

When permanently banded, the completed armature is turned over to an inspector who carefully checks all important dimensions and further tests the windings for short circuits, open circuits, cross connections, etc., by means of the portable testing yoke. If it passes this test it is given a high-voltage insulation test of 4,000 volts to ground using a portable testing box. The commutator is then undercut and the windings are given a heavy coat of a good grade of protecting and insulating varnish applied by means of an air spray paint pot, after which the armature is sent to the assembling floor to be placed in the motor frame.

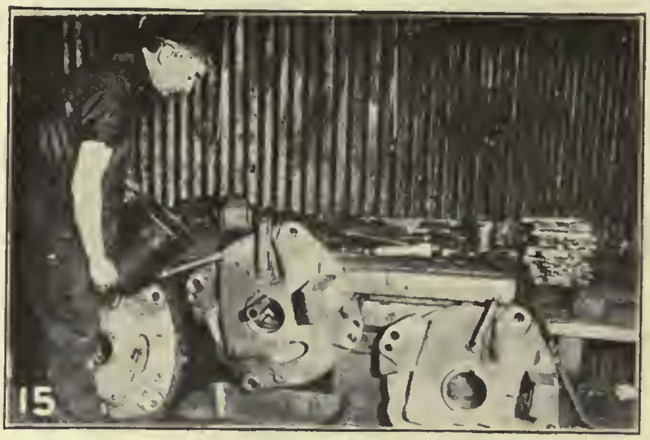
In the case of the armatures that are shipped out as spares where it is not possible to give them a running commercial test, there being no frames available, a bar to bar test is made. This test measures the voltage drop between adjacent commutator bars and is made to check any possible defects in the windings and soldering that ordinarily are detected during the running commercial test.

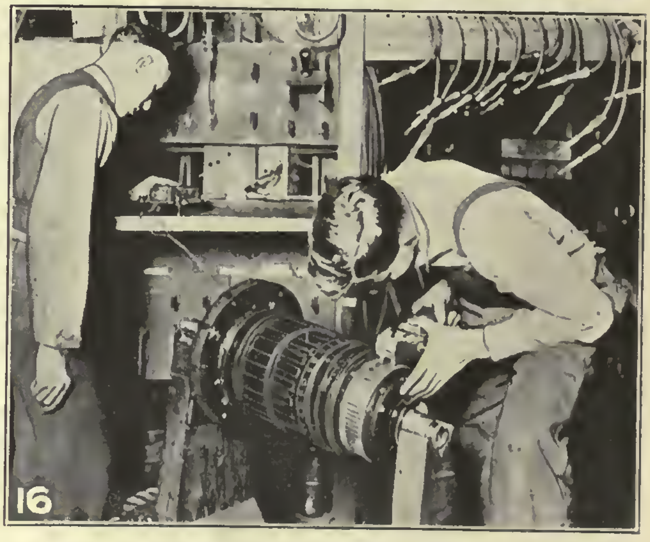
BRUSHHOLDERS ARE GAGED CAREFULLY

After the carbon boxes of the brushholders are machined they are hand fitted and carefully gaged with allowable working limit of exact size plus 0.002 in. to exact size plus 0.004 in., which insures a good snug fit of the carbon in the finished brushholder. This is very important to insure carbons that will not chatter and break and that will not develop rapid side wear in service. The pressure fingers after being assembled in place and adjusted are measured for tension by means of a spring balance and are finally set at a pressure ranging from 5 to 7 lb. per carbon. After being insulated and finally completed the brushholders are delivered to the inspection table, where they are again carefully gaged and checked in special clamping blocks to see that the distance from the center line of the supporting pin to the center line of the box is accurate, thus insuring correct neutral setting when the brushholder is clamped in the motor frame. The final test consists of a 5,000-volt ground test.

Separate brushholder supports with insulated studs are used in connection with the brushholder constructions of certain larger type motors. When assembled these are given a pulling test of 3 tons. This is essential to eliminate all defective and poor-fitting insulating tubes. This test is made on a specially designed machine fitted with a set of high multiplying power compound levers. The test insures the use of mechanically strong supports that will withstand the severe vibration and shocks to which they are subjected in service. After these supports have passed the mechanical test they are given a high voltage ground test of 5,000 volts similar to that applied to the complete brushholder.

The armature and axle bearings are made either of malleable iron or a high grade of bronze alloy, depending upon the type of motor and size of axles. They are





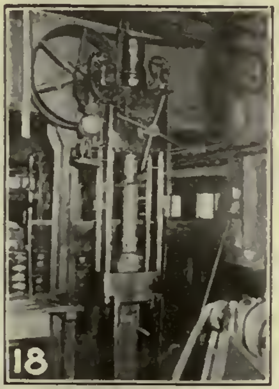
TESTING BRUSHHOLDERS AND ELIMINATING LEAKY HOUSINGS

No. 13—Portable Testing Box Used for High-Voltage Insulation Test on Brushholders.

No. 14—Pulling Test on Insulated Brushholder Supports.

No. 15—Testing Oil Wells of Housings for Leaks and Casting Defects.

No. 16—Bar to Bar Test on a Complete Armature.



NO. 17—PYROMETER AND AUTOMATIC TEMPERATURE CONTROL FOR BABBITTING PARTS. NO. 18—PRESSING BEARINGS IN HOUSINGS, USING 50-TON HYDRAULIC PRESS. NO. 19—TESTING FIELD COILS FOR SHORT CIRCUITS

accurately machined and carefully gaged to secure interchangeability of all parts. The babbitting or tinning of all bearings is done by expert workmen who have been carefully trained and are skilled in this kind of work. The bearing metal used is a carefully-selected high-grade babbitt prepared in the alloy department under the direct supervision of the metallurgist of the research department, which guarantees a uniform reliable bearing metal. During the process of babbitting the alloy is heated in pots that are fitted with automatic temperature control which holds the temperature of the molten metal within certain predetermined limits of 462 deg. to 480 deg. C. This has been found to give the most satisfactory results in connection with this work. After babbitting, some of the common sizes of armature bearings are broached, which gives a compact and smooth bearing surface.

All castings for housings are given a test to eliminate leaky oil wells. Each individual casting has carbon oil poured into its oil well and this is allowed to stand for five minutes to test for cracks and defects in the casting. All castings that show signs of leaking oil are discarded. This test is important and guarantees the use of castings that will not allow the oil to leak out through the casting instead of lubricating the bearings. This precaution reduces one of the possibilities of hot bearings due to insufficient oil. After this test the castings are boiled in a concentrated solution of lye in order to clean off all the core and molding sand. This operation is found necessary in order to get rid of all the sand and grit which might otherwise be carried by the oil to the journals and damage the bearings. As a further precaution against loose particles of sand, the inside of the oil wells of all other motor castings is painted while hot with a special grade of air-drying gray enamel.

The field coils after being wound are insulated and impregnated in order to improve their moisture repelling, heat resisting and insulating properties. They are carefully gaged and checked to keep them within predetermined maximum limiting dimensions so they will have a snug fit on the poles and can be readily assembled in the motor frame with sufficient clearance to allow for proper ventilation. All coils are given a short circuit test which eliminates all coils that have had the insulation damaged during the process of manufacture. They are also tested for open circuits, on the same test set used in making the short circuit test, by short circuiting the leads or terminals of the individual coils.

To meet certain requirements of operation under severe weather conditions, some types of motor frames, after coils are assembled in place with connections made, have the entire frame dipped in a good grade of insulating varnish and are then baked. This treatment is similar to the method outlined in connection with the dipping and baking of armatures.

Under certain conditions some assembled frames of railway motors are connected up to a testing circuit and direct current is passed through all of the field coils and their polarity checked by means of a compass needle or a polarity indicator made up from a small piece of steel banding wire magnetized and suspended at its center by a thin thread. This test is made to check the assembly of coils on the poles and the wiring around frame connections to insure against reversed coil windings.

The field coils and wiring around fields are given a high-voltage insulation test at 4,000 volts, alternating current to ground, momentarily. This test is made by using a portable testing box. The frame is then sent to the motor building floor, where the armature and bearing housing are assembled in place, after which the completed motor is sent to the testing department for its commercial or engineering tests.

Train Stop Part of Signaling System

THE train stop on the Metropolitan Railway of London is a part of the signaling apparatus which in the event of the signal being passed when at danger puts on the brakes and shuts off the power to bring the train to a stop. The brakes are applied by a vertical lever, known as the trigger and fixed on the right side of the leading locomotive coming in contact with the train stop arm, which mechanically opens a valve in the train pipe. The opening of this valve allows the air for holding off the brakes to escape, the brakes throughout the train being immediately applied, the power cut off and the train stopped. After this application and before the brakes can be released the motorman must get down on the line and reset the trigger on the train to the vertical position.

The train stop arm, 4 in. wide where it engages the trigger, is fixed on the right side of the line opposite the signal, and when in the "stop" position is 3 in. above the rail level, the center of the arm being 8 in. from the running edge of the rail. On a train leaving a block section the signal in the rear comes to the "off" position and the train stop arm, operated by a motor fixed in a cast iron box and bolted to the ties, moves to its off position, the arm then being below the top of the rail, unable to engage the trigger on the train when passing.

Control Trailers Used in Washington

In Order to Use Its Two-Car Train Service on Stub-End Lines the Washington Railway & Electric Company Has Equipped Some of the Remodeled Trailers with Control Equipment and Necessary Switches

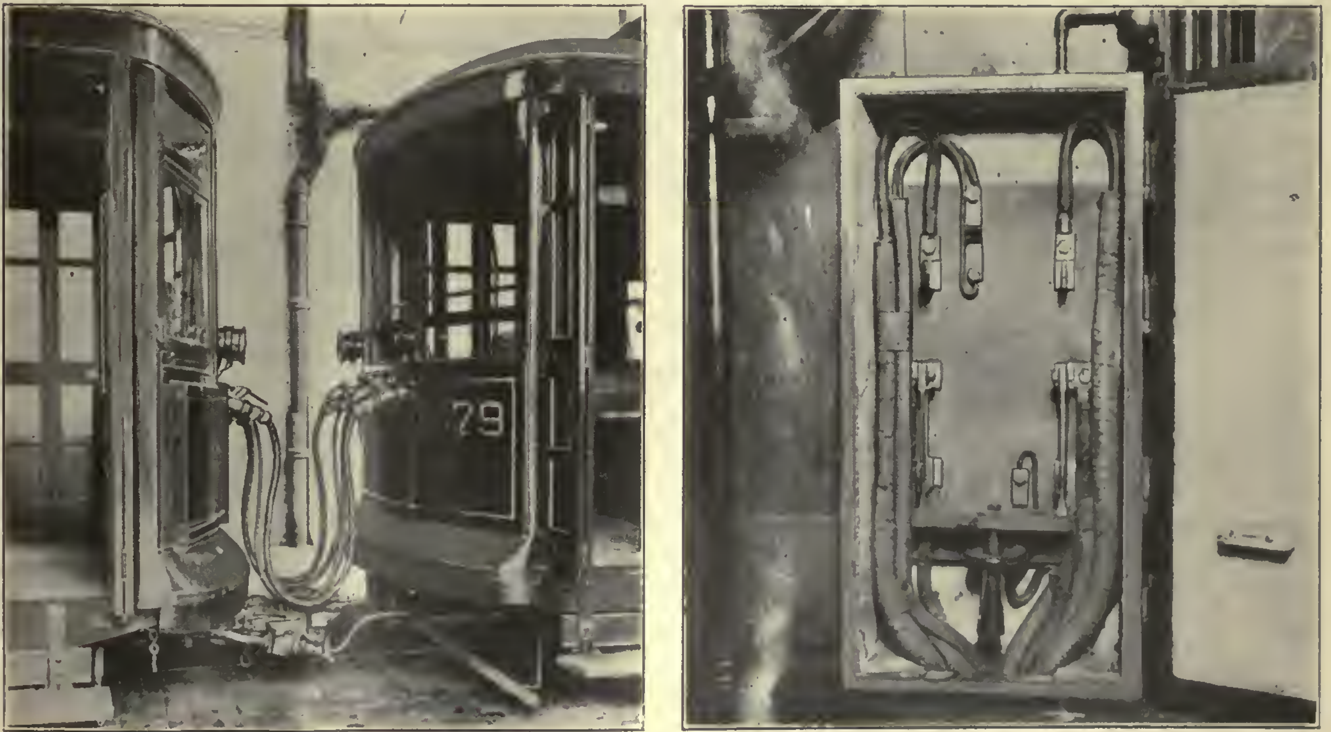
SINCE the publication of the article in the ELECTRIC RAILWAY JOURNAL for January 22, 1921, describing the trailers remodeled from open Narragansett cars by the Washington Railway & Electric Company two of these trailers have been equipped with control equipment, using straight "K" type control. Further details regarding the mounting of door engines and door and step control are now available. The provisions made for operating the two-car trains from the trailers were found necessary in order to adapt the two-car train operation to stub-end lines where it was necessary to operate from either end of the train. This was accomplished by using the remote control reverser and line switches on the motor car and by equipping the trailer with a separate resistance and one type K-66 controller with additional necessary circuits. Two additional jumpers, making four in all, are used between the cars. These are connected from receptacles mounted on the dash. Two are used with the control, door signal lights, buzzer and motorman's bell signal wire and two with the main motor wires and negative bus lines. The positive bus lines are carried one on each side of the coupler. The coupler is of the Tomlinson air-connecting type. On account of the electric switches used it is necessary to carry a current-collecting plow on both cars and always to operate from the plow on the leading car.

The leads from each plow are brought to a double-pole, double-throw changeover switch mounted in the vestibule of the motor car, and from this switch the current is fed into the two bus lines. An accompanying illustration shows this switch. The use of this switch was necessary to prevent the possibility of two plows being connected so as to short circuit the line. To make sure that the plow on the leading car will be used the ratchet switch wires from each controller are brought to two contacts on this switch. The connection between these wires is made when the switch is thrown in either direction, thus interlocking the controller on the leading car with the plow on that car. In order to eliminate a "push-in" if one plow is disabled, the controller on the end of the motor car adjacent to the trailer is arranged to operate from either plow. An accompanying illustration shows the arrangement of the jumper leads, together with the couplers and connections between cars.

SOME DETAILS OF DOOR AND STEP CONTROL

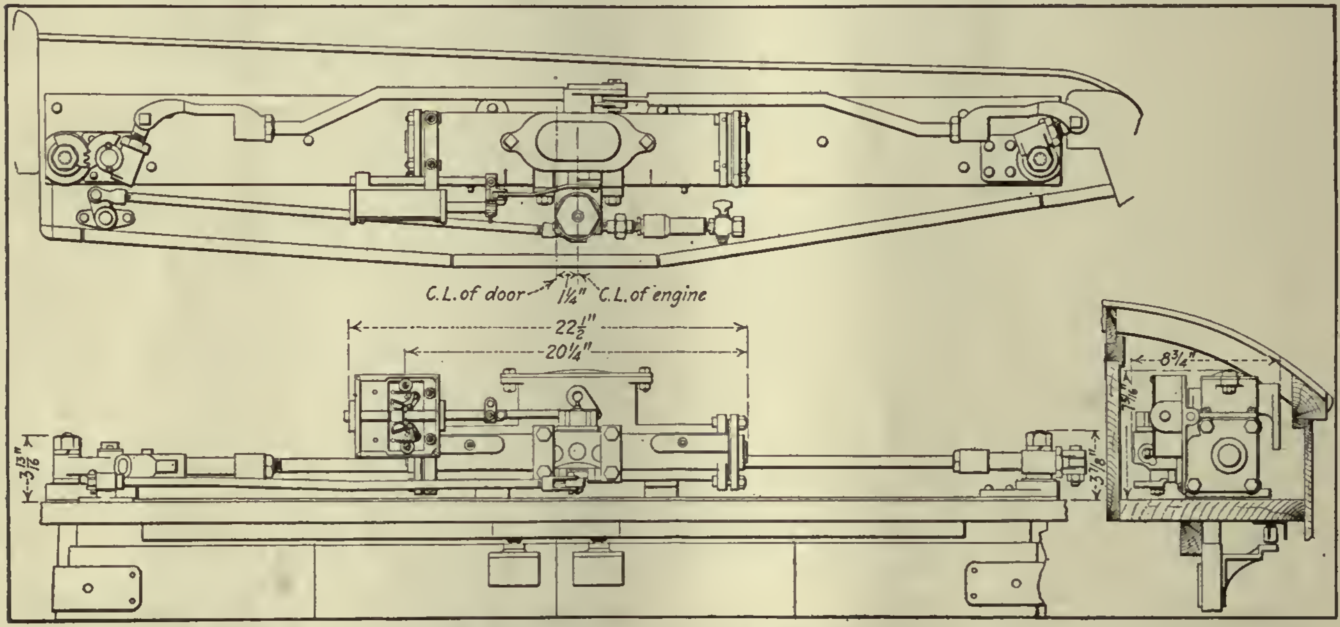
As stated in the previous article regarding these cars, they are equipped with pneumatic folding doors and folding steps, which are of an improved type furnished by the National Pneumatic Company. The doors and steps are operated by a G.M. 2⅝-in. x 4½-in. door engine placed in a pocket over the door. The valve for operating the engine to open or close the doors and steps is located directly on the engine, which insures a minimum consumption of air. As the conductor is stationed in the center of the bulkhead opening on the car floor proper above the platform level a pedestal control stand is used. The operation of the valve on the door engine is effected by a small handle at the conductor's station through a series of shafts, levers and rods.

By placing the door engine in the pocket above the



AT LEFT, VIEW OF ARRANGEMENT OF JUMPERS AND BUS LINES BETWEEN MOTOR AND TRAIL CARS; AT RIGHT, DOUBLE-POLE CHANGEOVER SWITCH USED FOR CONNECTING LEADS FROM PLOW doors on a ⅛-in. x 5-in. steel plate which continues to both door shafts a more substantial construction is obtained. The door shafts pass through this plate with their bearings riveted to it. The seats of the engines in turn are bolted through the plate and door header. The door shafts are operated from the engine by connecting rods through adjustable levers on the top of the door shafts in the pocket. The steps are operated from the bottom of the door shafts through a slide bar type connection.

The great advantage of this construction is that the engine and the door shafts are tied together as one mechanical unit. A diagram of this construction is shown in an accompanying illustration. Other advantages are the accessibility of the engine and connections for inspection, adjustment and oiling, the fact that these parts are practically inclosed in a dirt and dust proof inclosure and the high drainage point which eliminates moisture from the engine valve and prevents freezing trouble in winter.



Door Engine Installation in Header Over Door

The air supply for the engine is taken directly from the train line at regular service pressure. The consumption of air is about $\frac{1}{36}$ of a cubic foot for each complete opening and closing cycle. The air is strained through a curled hair strainer before reaching the engine valve to eliminate particles of sand or pipe scale. The engine has splash feed lubrication, similar to the automobile transmission principle, and will run two years with one filling, the grease which works out with the exhaust air being returned to the gear for further service.

The opening and closing movements of the doors and steps are checked or cushioned, thus preventing the abuse and deterioration due to "slamming." The regulation of this "cushioning" feature is accessible only to the shop men by means of proper tools. This is done to prevent the train crews from changing or tampering with the speed of the doors and thus altering the "cushion." The speed of the doors is predetermined and set before the cars go into service, which eliminates abusive use by the train crews and saves adjustment, wear and tear on door panels, glass breakage and reduces maintenance cost on all parts of the doors, steps and rigging. The door shafts are the National Pneumatic Company's standard type with combination ball bearings and thrust collar construction, which take both the side and end thrust wear.

The steps are of the three-arm type, ball bearing, with adjustable balance spring to insure even, smooth operation both opening and closing. The arms are mounted on the shaft by which the step is operated by an adjustable lever and connections through the slide bar to the door shaft. By using the same ball-bearing and thrust-collar construction as on the door shafts a self-aligning step is obtained. Further, the steps may be struck by obstructions on the street and the hangers thrown out of line to a decided degree before the step would fail to operate because of the thrust-collar construction.

The cars are equipped with the National Pneumatic Company's motorman's signal light system, which gives the motorman a light in his cab when all doors in the train are closed and constitutes the starting signal. The door-switch contact for passing the signal light to the motorman is mounted directly on and mechanically connected to the engine to reduce the possibility of mechanical or electrical failure. In addition to this it is so arranged that should there be a mechanical or electrical failure the motorman would get the danger signal and would not start the train until the trouble was located.

In adopting the pneumatically operated doors and steps the railway had in mind the advantages from a fare collection standpoint, there being no physical effort necessary on the conductor's part, so that he is more physically and mentally alert to attend to his work. This is an especially important factor when trains are operated between single-car units on the same track.

Standards recently approved by the American Engineering Standards Committee include four copper specifications submitted by the American Society for Testing Materials as "tentative American standard." They are as follows: Soft or annealed copper wire; Lake copper wire, bars, cakes, slabs, billets, ingots, and ingot bars; electrolytic copper wire bars, cakes, slabs, billets, ingots, and ingot bars; and battery assay of copper.

Atlanta Making Electrical Survey

A Complete Miniature Equivalent of the Electrical Distribution, Overhead and Track Circuits Aids Electrical Department of Georgia Railway & Power Company in Its Study to Revamp Its Distribution System and Relocate Substations

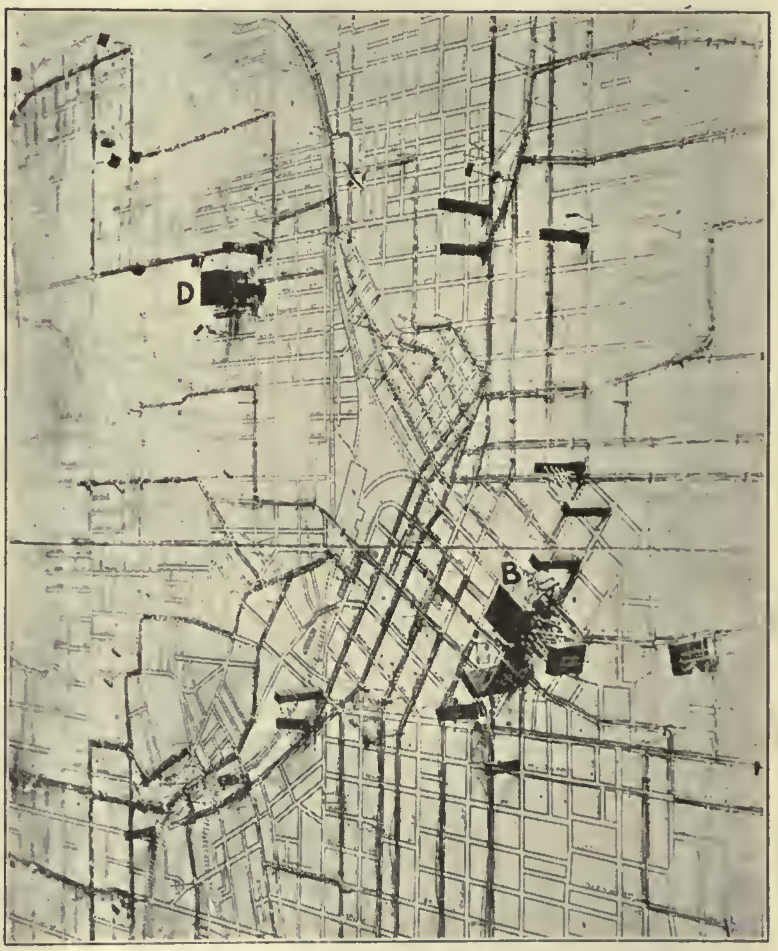
IN ORDER to get a real test of various proposed schemes for revamping its distribution and overhead system and for relocating its entire group of substations, the Georgia Railway & Power Company, Atlanta, Ga., has constructed a complete miniature of the electrical system of the Atlanta railway property. The two accompanying illustrations show, first, a complete view of the entire miniature layout and, second, a close-up view of the central portion of the city, which will indicate some of the details of construction of this miniature system.

The present arrangement in Atlanta is, as noted, that there are two main stations located rather close to the center of the city, which is, of course, the main or practical load center of the railway system. These two stations are fed with energy from incoming high-tension transmission lines from the company's state-wide distribution system connected with its water power and steam generating stations. As Atlanta has grown during the past few years, it has necessitated sending more and more of this electrical energy, after transformation into direct current, to the outlying portions of the city to take care of the rapidly increasing railway load. It appeared to the electrical department that probably it would be most economical, with existing apparatus and information available, to locate the substations nearer the outer edge of the city, so that the electrical energy would not have to be transmitted clear to the center as alternating current and redistributed, practically back over the same course, to the outlying portions.

It appeared that possibly a belt, or 600-volt bus, with a radius of a mile or more, perhaps, should be installed with substations located at strategic points along this circular bus. Energy could be delivered to these substations and after transformation distributed both in and out from this circular bus, thus making probably the most efficient combined transmission and distribution system. Another advantage of a scheme such as this would be that almost the best possible type of network would be created so that if any one substation, or even two substations, went out of commission, the rest could carry the load most effectively.

The above conclusions were reached merely as a result of a preliminary investigation, and it was thought that the quickest way to determine the real answer to the most economical location of substations and the most economical use of copper in the distribution and overhead system would be to make actual experiments on the system. This would have involved an impossible cost and so the idea was adopted of building a complete miniature.

A map of Atlanta was laid out on a vertical board some 8 ft. or 9 ft. high and 12 ft. or 14 ft. long or wide. On this map the system was constructed as follows: For every single track, that is, every pair of rails, a wire was laid which had exactly the same resistance per unit of track as represented on the map as did the actual track between the same two points on the system, so far as could be determined, taking into consideration the earth resistance also. Thus, single-tracked streets carry one wire and double-tracked streets two wires. The overhead was constructed on small poles or pins representing poles, and each overhead contact trolley is represented in the miniature by a small wire of exactly the same resistance between any two points on the map as between the two corresponding points on the real system. Likewise, the feeder system is reproduced on the poles, all taps being reproduced exactly as they exist on the actual property. Substations are represented by large blocks, as indicated in the accompanying illustration. To represent the loads, for each of the various types of cars in use at Atlanta a small resistance unit has been made up, so that when placed by clips between the trolley wire and track, its resistance is such that it will draw 1/100 of full-load current when 6 volts is applied across the trolley and track.

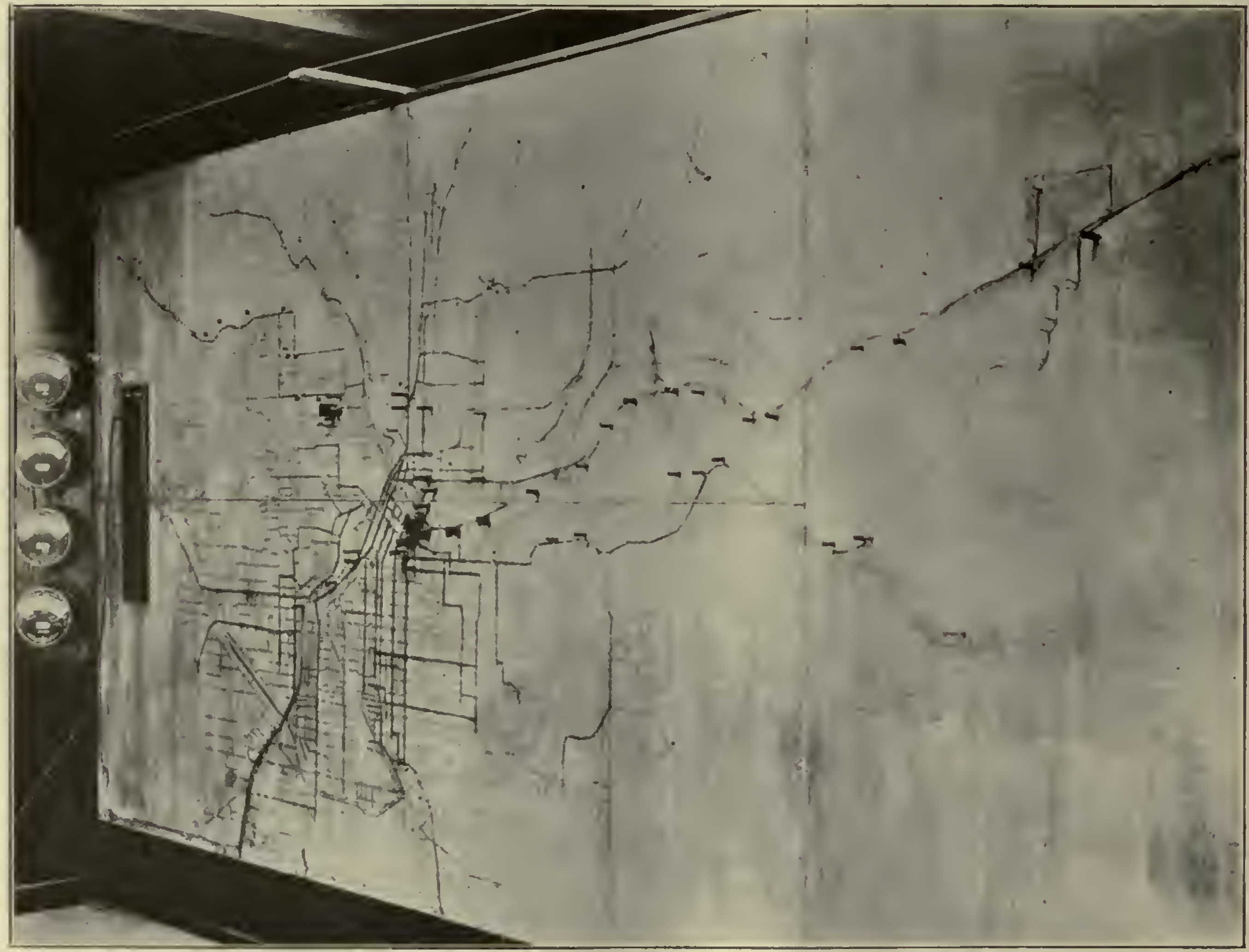


CENTRAL PORTION OF ATLANTA MINIATURE SYSTEM

A large storage battery constitutes the power plant for providing energy. This is a 6-volt battery, 1/100 of the voltage used in service in Atlanta. By means of the plug board at the left of the miniature map, this 6-volt battery can be connected to any one or any number of various points which may be chosen as distribution centers or locations of possible future stations. From this plug board there are semi-permanent connections to the various possible places on the system that are being considered as substation sites. Voltmeters and ammeters and millivoltmeters are available with accurately calibrated leads, to measure the line voltage at various points, the current in various feeders, and the line drops between various points on the system respectively.

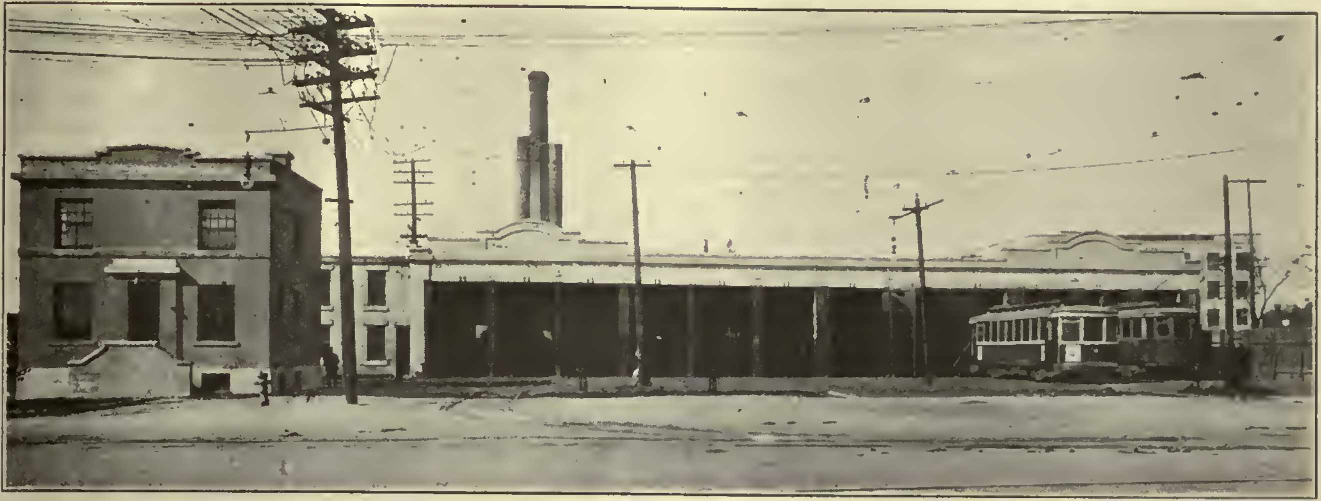
A large blueprint hanging on an adjacent wall has plotted on it the several distributions of cars which it is desired to study. For instance, there is on this blueprint, in symbols, the location of each car on the system at the maximum peak of the system. Other distributions of cars may also be indicated on this blueprint. When it is desired to study any particular load on the miniature, the various resistances representing street car loads are placed on this miniature map in the position indicated on the blueprint of the system and there is reproduced then the instantaneous load representing some certain average time.

And so studies are being made. Different points are chosen as possible substation sites, energy applied there with the resulting distribution characteristics noted. Other substation sites are chosen, ring buses at 600 volts can be installed, the distribution system entirely revamped in the miniature and the result accurately noted. The load drawn from various substations at various assumed positions is also studied, so that it will be possible to determine whether one-unit or two-unit or three-unit substations are needed at certain points. Anticipating results somewhat, the electrical department feels that the survey may show the economical advantage of applying automatic substations at several points on such a ring bus as being the most economical substation scheme for the system. This, of course, is only a prediction.


COMPLETE ATLANTA RAILWAY SYSTEM CONSTRUCTED IN MINIATURE FOR TEST PURPOSES

The map is made up on a scale of 200 ft. to the inch. Voltage and current values are 1/100 of actual values, as indicated. The peak load on the miniature is something over 600 volt-amperes, corresponding to a 6,000-kw. peak load on the system in reality.

This whole installation has been designed and constructed under the direction of H. L. Wills, the electrical engineer of the Georgia Railway & Power Company. The results of the actual study are not available as yet, as the study has not been completed, but they will doubtless prove interesting when they are available as indicating the value of such a laboratory scheme of making surveys of this sort.



RECONSTRUCTED CAR SHOPS IN WINNIPEG

Repair Shops Rebuilt in Winnipeg

A Disastrous Fire Last Year Destroyed the Shops and Carhouses of the Winnipeg (Canada) Electric Railway—These Have Been Rebuilt and Greatly Improved

BY W. N. SMITH
Consulting Engineer Winnipeg Electric Railway

THE carhouses of the Winnipeg (Canada) Electric Railway, at Main Street and Assiniboine Avenue, in Winnipeg, were destroyed by fire on April 7, 1920. They had been constructed in 1901 with brick walls and roof of 3-in. T. & G. boards on steel beams, with tar and gravel roofing and flat glass skylights over the two center bays. There was a 21-in. fire wall between the carhouse and machine shops in the rear with three through repair tracks, two of which had pits underneath. The openings in the fire wall were protected by Underwriters' tin-clad fire doors and these were closed by the men on duty before the fire reached the west end of the carhouses. These fire doors, although so badly charred that they had to be renewed, prevented the fire breaking through to the machine shop.

The fire wall and the brick wall on the south side between the carhouse and storerooms were severely tested by the intense heat of the fire and the brick "spalled" on the face, but these walls and the repair pit walls were found to be sufficiently strong to be used again in the reconstruction. The walls on the Main Street and Assiniboine Avenue elevations were, however, pulled down.

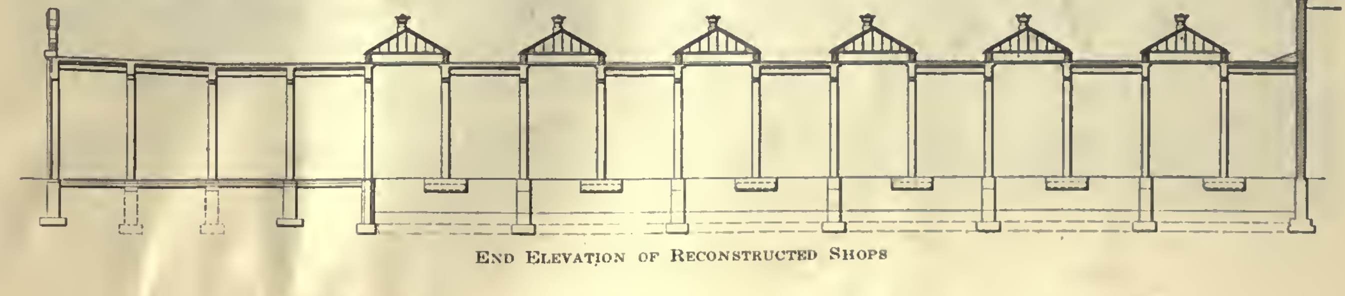
It was decided to use reinforced concrete with brick walls for the reconstruction. On the Assiniboine Avenue side 8-in. brick walls with "HB" reinforcement and 13-in. pilasters every 12 ft. were used to lighten the dead load and save underpinning the old foundations, which would otherwise have been necessary due to the increased dead load from the concrete roof slab. In the spandrels between the pilasters "Fenestra" steel sash were installed, double-glazed with cast-wired glass on the outside and 16-oz. sheet on the inside to reduce the heat losses in winter. This double glazing saves approximately 40 per cent of the heat units ordinarily lost through a single-glazed window.

The track doors on the Main Street front are of wood hung on heavy strap hinges and have wired glass panels in the upper portion. There are twelve pairs of these doors. The building is 132 ft. wide, divided into four 33-ft. bays with 12-in. x 12-in. concrete columns. Where the columns occur the hinges were built into the concrete, and intermediate columns of channel iron were used to support the remaining doors.

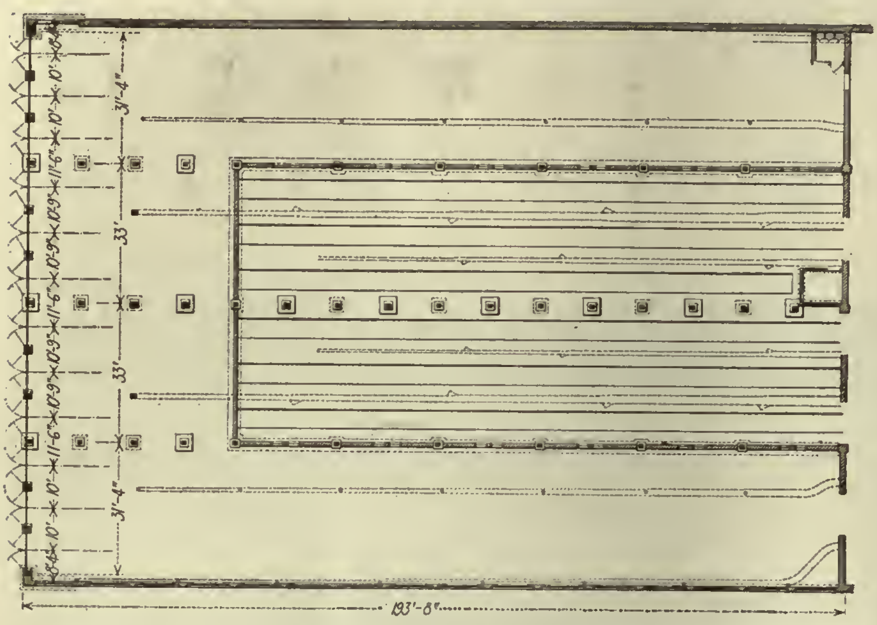
SKYLIGHT CONSTRUCTION OVERCOMES TROUBLE FROM CONDENSATION

Considerable trouble had been experienced in the old carhouse from condensation on the skylights and roof. To overcome this the skylights were constructed of cast-wired glass on galvanized iron frames and a flat ceiling light with 16-oz. glass was built in below the skylight curb walls at the ceiling line. Ventilators with regulating dampers were carried through these ceiling lights to carry off the moisture and smoke from the car heaters. The concrete roof slab was insulated as follows: "Insulite" (a compound wood pulp product of high insulating value) was cemented with hot asphalt directly on top of the slab and on the Insulite a Barrett specification felt and gravel roof was built up. This, together with the double glazing of the skylights, has proved quite satisfactory during the past winter.

The lighting consists of eleven rows of lights, placed above the runways between tracks, the outlets being at 24-ft. centers and equipped with 150-watt distributing-type porcelain enameled reflectors. Four 300-watt "nitro" lamps with weatherproof angle reflectors are placed above the entrance doors to light the tracks outside, together with an arc lamp at the street



END ELEVATION OF RECONSTRUCTED SHOPS



SECTION OF NEW SHOP BUILDING

line. The repair pits are lighted with angle reflectors, throwing the light out horizontally from the side walls and column bases in the pit. All the above lights are controlled from a panelboard located beside the office of the carhouse foreman. In addition to the above there are twenty-one plug receptacles on the columns in the repair pit and above the track level for extension-cord lamps. All wiring is run in conduit using 110 volts alternating current.

The trolley wires are supported on brackets fastened to a wooden trough which is supported by the concrete roof beams. The trough was painted on all sides before erection to preserve the timber. Pieces of 2-in. x 12-in. plank 4 ft. long were fastened to the concrete roof beams by expansion bolts. These pieces project 18 in. on each side of the beams and the trolley trough is bolted to these pieces 6 in. from the ends, so that there is no possibility of a metallic contact with the reinforcing rods in the beams should a trolley pole jump the wire when a car is being moved inside the barn.

A fan and steam coils located in the machine shop supply heat for both shop and carhouse. Four galvanized-iron ducts are carried overhead with outlets every 24 ft. looking downward at 45 deg. Two of these are carried under the roof beams on each side bay. The two center bays are heated by four ducts in the repair pit slung under the wooden sidewalks that run between the tracks. Regulating dampers are placed on all the main ducts. From 3.5 to 5 lb. of steam pressure is carried on the steam coils. The condensation is returned to the boilers by "Cole" tilting return traps.

The concrete roof slab is 4½ in. on 12-ft. spans with ⅜-in. round bars. The beams have a span of 33 ft. and are supported by concrete columns 12 in. x 14 in. Where available, the old footings were used, and where new footings were necessary these are of reinforced concrete. The roof beams and slab were pitched so as to shed rain water to six hoppers in the roof. Pratt & Ross, architects and engineers, were responsible for the design and construction.

The company also built a small brick and stucco office building facing Main Street immediately in front of the stores. This provides accommodation for the supervisors and cashier on the ground floor and for the construction department on the second floor. Ample toilet accommodation for motormen and conductors is provided for in the basement.

Track Labor Costs

Relaying Operations Reduced in Connecticut by the More Extended Use of Machinery, Better Organization, Smaller Gangs and Other Improved Methods —Interesting Statistics Given

BY P. NEY WILSON
Formerly Roadmaster the Connecticut Company, New Haven, Conn.; Now Assistant to the Engineer of Surface Roadway, Brooklyn (N. Y.) Rapid Transit Company

THE Connecticut Company has obtained some interesting results by comparing the labor cost per foot of single track relaid in 1914 to the same unit as determined during relaying operations in 1920. Before this analysis was made it was expected that the unit costs would rise in proportion to the increase in the rate of pay per hour for labor. In fact, we thought our costs

THE FIRST VIEW SHOWS THE COMPLETED TRACK READY FOR CONCRETE PAVEMENT—THE CONCRETE MIXER IN OPERATION IS SHOWN IN THE SECOND VIEW

JACKING OLD TRACK OUT OF THE STREET—WHEN JACKED OUT THE STEAM SHOVEL LOADS THE SURPLUS MATERIAL ONTO TRUCKS

would be even higher than this due to the inefficiency of labor during the war period. While it was perfectly evident that the men in the trench were not producing as much work per day in 1920 as they were in 1914, we were somewhat surprised to find that the use of labor-saving machinery, smaller gangs, better organization and other improved methods more than offset the indifference of the man with the pick and shovel.

In 1914 no special track machinery was used, all trackwork being done by hand. The rate per hour for labor was 15 cents. In 1920 we used a power shovel, tamping machines, arc welders, etc., paying labor 50 cents per hour. For obvious reasons small gangs were used and we were in closer contact with them. We believe that a first-class track foreman can handle only twenty men efficiently, and this belief was borne out by the results obtained.

The psychological effect of being close to the men in the gangs should be considered, as surprising results may be gained when there is a correct mental attitude in the men in the trench. This was only possible occasionally during the war period, as the demand for labor was so great that indifferent workmen were the rule. One exception to this rule was called to our attention. The same gang rebuilt a certain piece of track, laying half of it in the fall and completing it in the spring.

The cost for labor for the first half of the work was \$1.73 per foot of single track, whereas the cost of the same unit for the second half of the work was only \$1 34. In the second instance the men were facing the end of the job and were induced to try to finish it as soon as possible, whereas under the first condition they were just beginning the work and were making wartime motions and receiving a day's pay. The following figures give the cost of labor per foot of single track in various relaying jobs during 1914 and 1920:

COST OF LABOR IN VARIOUS JOBS PER FOOT OF SINGLE TRACK

Case No.	1914	1920	Per Cent Increase 1920 Over 1914
1	\$1.19	\$1.65	....
2	1.07	2.06	....
3	1.09	1.61	....
4	1.08	1.75	....
5	.90	....	....
6	1.09	....	....
7	.79	....	....
Average...........	\$1.03	\$1.77	72
Rate per hour......	.15	.50	233

NOTE.—Unit costs per foot in this table do not include paving charges, maintenance of machines, overhead, etc., but include labor charges only.

The question naturally arises whether the 1920 work was fairly comparable with that in 1914. Most of the operations consisted of relaying 7-in. 70-lb. plain girder (high T) rail in macadam streets and was carried on by the same foremen who held, throughout the period covered, the same nucleus of a track-laying organization. An intimate study of the conditions involved shows the comparison to be as fair as any comparison can be. Slightly different conditions were encountered on each street as compared with other streets, but we consider that the averages take care of these inequalities.

The results are surprising and may be a coincidence. However, the economies effected are certainly encouraging.

Valtellina Locomotive Rheostat

THE new type of locomotive furnished by the Westinghouse company for the Valtellina electrification, which is three-phase, has a model arrangement for the liquid resistances used to control the induction motors. The rheostat consists of a metal tank with conic ribs and plate electrodes, between which the electrolyte—a soda solution—closes the circuit when the solution is raised by compressed air. The valve controlling the air is operated manually by a lever in the engineer's cabin, but is also controlled by a spring which is actuated by the moving element of a wattmeter. The current coil of the wattmeter is in the grounded phase and the potential coil is between the two overhead lines. At starting, the driver places the lever in a certain position, thereby admitting air to the liquid rheostat, which causes it to start. If the input increases beyond the value corresponding to the lever position the deflection on the wattmeter is increased accordingly, and, by means of the spring, partly closes the air valve and so reduces the input to the proper amount.

In this way the locomotive automatically takes a constant input when starting, this input being determined by the position of the lever. Pulsations in the supply pressure are also compensated for in this manner.

When a slow speed is attained the liquid starter is automatically short-circuited. The volume of the soda solution is about 900 liters and the liquid is actively circulated to assist cooling and so to provide more uniform resistance and less evaporation.

Automatic Train Registering

The Brooklyn Rapid Transit Company Has Installed Two Registering Instruments in the Chief Dispatcher's Office to Show Time Trains Pass Various Points and Stations

By A. A. Roberts
Assistant Signal Engineer Brooklyn (N. Y.) Rapid Transit Company

A NOVEL and interesting system for registering the passage of trains has recently been installed by the signal department of the Brooklyn Rapid Transit Company that provides the central dispatching office with a continuous, graphic time record of train movements at certain critical locations. Two registering instruments known as "Hedwaygraphs" are used. These devices are manufactured by the Cleveland Electrical Instrument Company, which adapted for the purpose one of its standard types of recording pyrometers. An accompanying illustration shows the two Hedwaygraphs mounted directly behind the chief dispatcher's desk on the top of a cabinet, the interior of which contains the controlling relays and most of the local wiring.

One of the two instruments, each of which is equipped for making four independent records, is employed to register the time of trains passing on each of the four tracks of the Broadway subway at the Thirty-fourth street station in Manhattan. The other instrument makes a similar record for the two tracks over the Williamsburg Bridge near the Essex Street station and also for the two tracks of the Montague Street tunnel near the Court Street station.

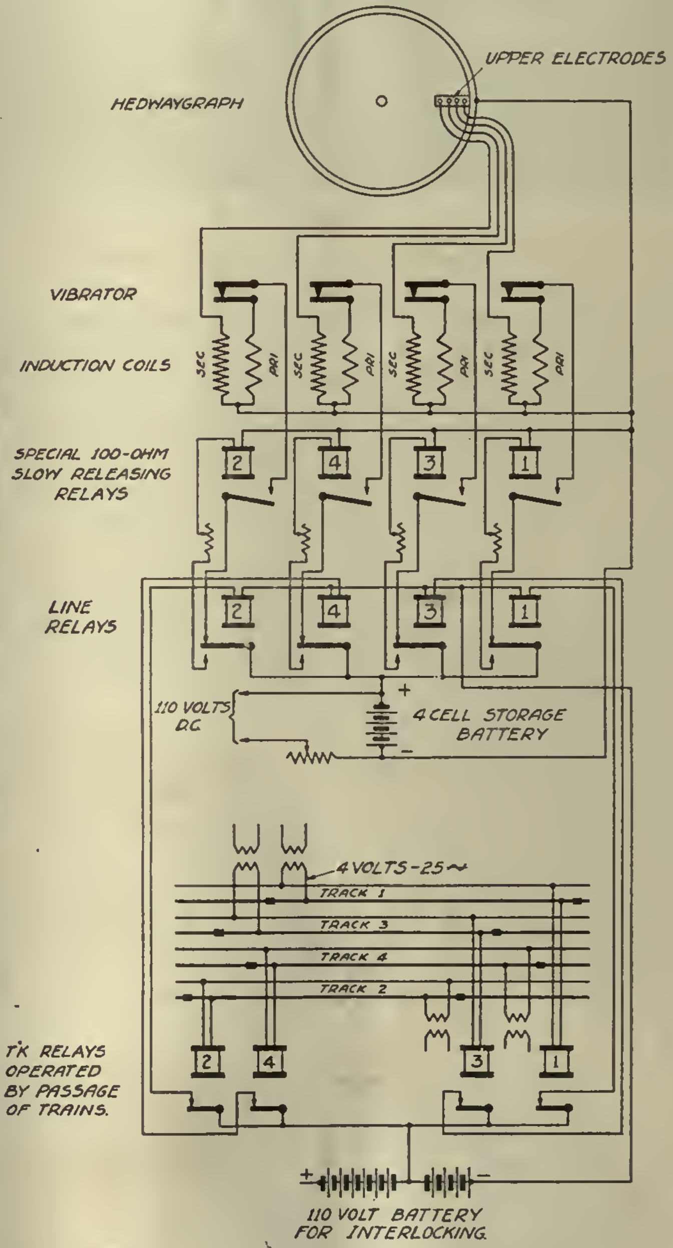
Two Hedwaygraphs Are Located in the Chief Dispatcher's Office

Each Hedwaygraph consists essentially of a 24-in. dial of paper rotated by a self-winding clock mechanism and inclosed in a circular case of spun sheet metal. A glass-paneled cover permits ready inspection of the chart at all times. The chart is virtually a twenty-four hour clock dial divided by radial lines into hours with subdivisions of ten minutes each. Circular bands near the margin of the dial serve mainly to obtain a suitable color contrast, so that blue printed copies of the record may be made without difficulty. The automatic record of the passing of trains is obtained by the discharge of a spark from suitable electrodes which puncture the charts. A view of the four adjustable spark electrodes mounted in an insulating plate of Bakelite is shown in one of the illustrations. The discharge passes through the paper dial to a common electrode located under the chart and directly beneath the four upper spark points.

The time interval between trains under conditions of maximum traffic is seldom less than ninety seconds, corresponding to a linear distance of approximately 0.06 in. on the circumference of the inner band of the dial, which is 18¾ in. in diameter. Since successive punctures are readily distinguished even when spaced at distances considerably smaller than 0.06 in., little difficulty is encountered from indistinct traces.

Method of Control Used

The method of control employed and the sequence of the various operations that take place in producing a record on the chart may be easily understood by referring to the typical wiring scheme shown. The four tracks indicated in the lower portion of the diagram represent the location at which a check on the uniformity of train movements is desired. The track circuits and track relays are those employed for the block signal system. These track relays are located adjacent to the track circuits and control energy taken from local storage batteries through the company's telephone cables to the line relays, which are located in the cabinet in the dispatcher's office and serve to repeat the opera-



Wiring Diagram for Control of Hedwaygraphs tion of the track relays and thus to confine locally most of the special wiring. These relays are of the simple and inexpensive type commonly made use of in telegraph systems.

Special 100-ohm relays were furnished for this installation by the Chicago Railway Signal & Supply Company. These are of the familiar type used in direct-current block signal work, but having certain modifications designed to secure a retardation of approximately one-quarter second in the time required for the contacts to open after the relays become de-energized. The degree of time delay in contact opening necessary to produce a spark discharge of the proper duration was determined experimentally previous to the selection of the type of control apparatus to be used. Adjustable resistances inserted in the coil circuit of the special relays furnish a simple means of varying the retardation sufficiently to meet all requirements.

A train entering upon the governing track circuit, for instance on track No. 1, starts the sequence of events by shunting open the track relay, which in turn opens the corresponding line relay No. 1. A back contact on the line relay then completes the circuit from the four-cell local battery that energizes the special relay and closes the contact thereon. This condition holds until the track and line relays are again energized due to the train leaving the track circuit. At this instant a circuit is completed from the local battery through the primary of the induction coil and front contacts of the line and special relays that energizes the coil and causes the discharge of the secondary to puncture the chart.

This system has now been in successful operation for about eight months and the instruments and control apparatus require very little attention. Maintenance consists mainly in the occasional cleaning of the electrodes and their replacement at infrequent intervals.

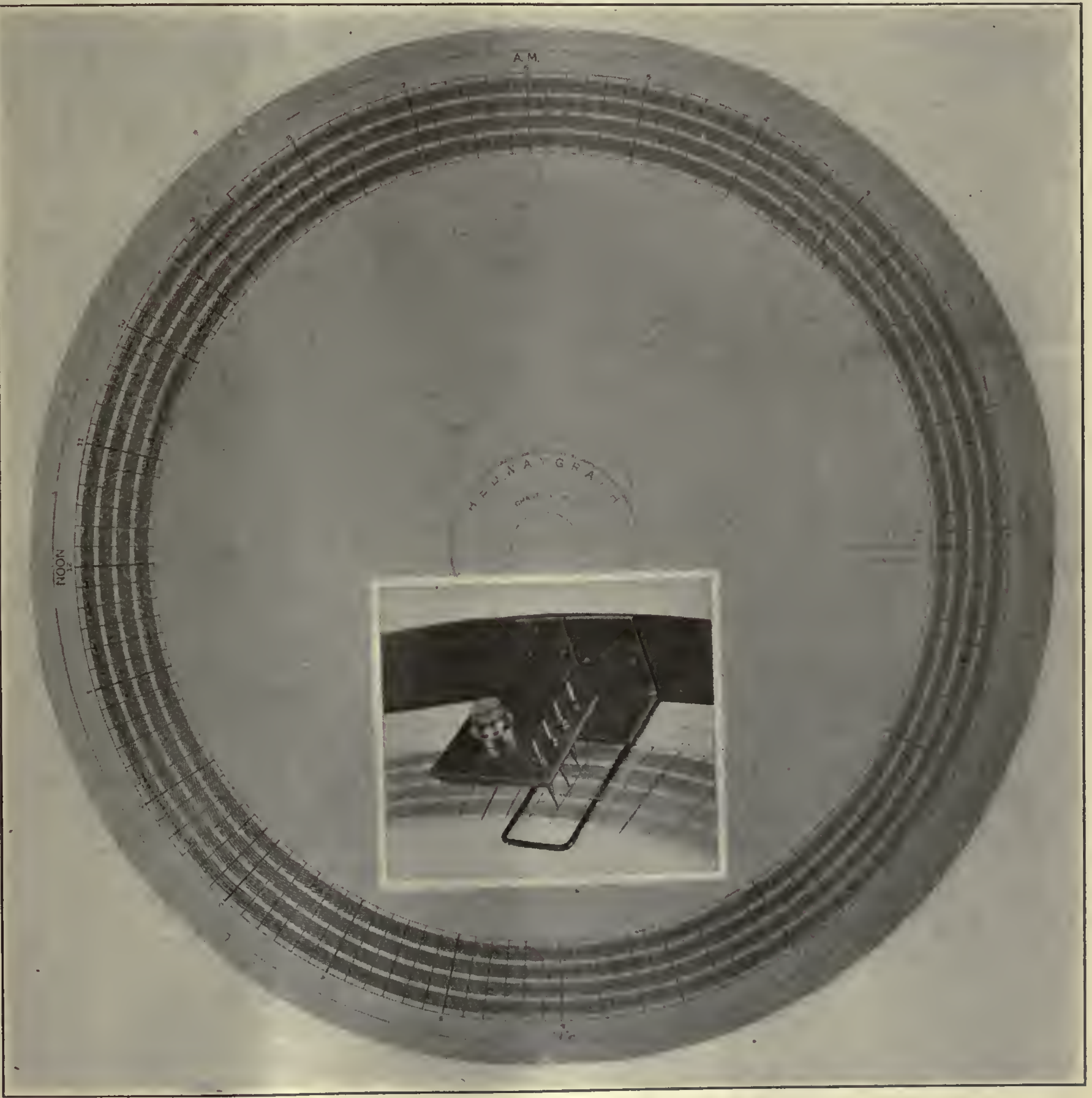


Chart Showing Actual Record for Twenty-four Hours—Insert Shows Mounting of Four Adjustable Spark Electrodes

What Is Service?*

BY H. A. LEMMON

PERFECT service is electric energy always available without interruption at a constant standard voltage. From El Paso we operate a street car line into Juarez, a little city just across the Rio Grande in Mexico. About ten years ago relations between the two countries were somewhat strained. Our army had dropped a few shells into the Mexican city, and if there were any Mexicans who were lying awake nights consumed with love for their American cousins, they very effectually concealed that passion.

Operating our street cars across the two international bridges was attended with difficulty—with adventure; in fact, our cars had a way of losing their windows on the journey, and our conductors of coming back without any cash, but plenty of torn clothes and black eyes and explanations. There were reasons why we determined to keep going, and selecting car crews was quite an important task.

Employed on the El Paso lines was a conductor named Jim Burleson. Burleson hadn't attracted any particular attention. He was just an ordinary, quiet, peaceable chap, with a dry sense of kindly humor, who attended strictly to the business of the company and made it his own business. Some one suggested placing Jim on the Mexican line. He took it as all-in-the-day's work.

He didn't know much Spanish, but he learned to say "Gracias Señor" and picked up a few more words, until he could exchange a sentence or two of amiable banter with every frowsy señorita and dirty Mexican kid who ventured to get on his car. Mexicans and Americans, they all looked alike to Jim, and all received the same kindly treatment. He came home with the cash, with all of his windows intact and with no black eyes, and because he did these things he just dropped out of sight, as it were. No one paid any attention to him. He didn't figure in the day's news one way or the other.

And then one day Jim Burleson contracted pneumonia. Forty-eight hours later he was dead. The newspapers of El Paso recorded Jim's passing away in a four-line conventional notice. He had lived and he died in a little shack near the carhouse and was without surviving relatives to arrange the details of the last ceremonies. A group of his fellow employees got together and appointed themselves pallbearers. They went even further and engaged a carriage to convey the minister to the cemetery.

At the appointed hour the funeral started, but in some respects not quite according to the original conception. Instead of merely a few of his fellow workmen and the carriage containing the minister, there appeared upon the scene and in the procession the old, gray-haired, gray-bearded Mayor of Juarez, who had sworn never again to set foot on American soil; his City Councilmen, a delegation of Mexican customs officials, a group of other Mexican federal officials, and a little escort of Mexican soldiers (in civilian clothes because of the strained relations and because of the international law). And there also was the Mayor of El Paso and his fellow members of the City Council, representatives of the United States Customs Service, an unofficial representation of officers and soldiers from Fort Bliss, and carriage after carriage filled with the substantial citizenry of the bustling Texas city. And even this was not all. There were over a half mile of Mexican people on foot and in rented, broken-down, dilapidated carriages, who, for the time being, had set aside their hatred of the gringo. Among them were the school teachers and mothers of Mexican children, and, perhaps, greatest tribute of all, three huge wagonloads of dirty, ragged, unkempt Mexican school children themselves.

Every school in Juarez was closed the entire day of Jim Burleson's funeral; every business house was closed that afternoon, and in the little old church for which Juarez is far-famed throngs of worshippers crowded in from morning until away late in the night, offering prayers for the repose of the soul of a man who didn't measure service with a voltmeter.

What is service?

Changes in Retail Prices of Food

THE U. S. Department of Labor, through the Bureau of Labor Statistics, has completed the compilations showing changes in the retail cost of food in August in fourteen principal cities of the United States.

During the month from July 15 to Aug. 15, 1921, there was an increase in all of these cities. In Philadelphia there was an increase of 6 per cent; in Bridgeport, Chicago, New Haven, Providence, and Washington, 5 per cent; in Kansas City, 4 per cent; in St. Louis, Springfield, Ill., and Birmingham, 3 per cent; in Peoria, 2 per cent; in Salt Lake City, Denver, Little Rock, 1 per cent.

For the year period Aug. 15, 1920, to Aug. 15, 1921, there was a decrease of 28 per cent in Denver, Little Rock, St. Louis and Salt Lake City; 27 per cent in New Haven and Birmingham; 26 per cent in Peoria and Springfield, Ill.; 25 per cent in Philadelphia; 24 per cent in Kansas City; 23 per cent in Bridgeport, Chicago and Providence; and 21 per cent in Washington.

Corrosion of Cables in St. Louis*

THE latter part of June, 1913, the Union Electric Light & Power Company of St. Louis began the operation of a substation at which power was received from the Mississippi River Power Company, Keokuk, Iowa, and distributed to its city substations through seven 13,200-volt, 25-cycle, and 13,000-volt, 60-cycle, three-phase, cambric insulated, underground cables. The United Railways Company also received power at this substation and converted it there into direct current for the operation of some of its cars. The cables of the two companies occupy the same duct run for a considerable part of their length. Part of the duct was tile and another part was fibrous conduit.

Burnouts on these cables began to occur and these became serious in 1914 and reached a maximum in 1916. A thorough investigation of the trouble was begun by engineers of the two companies with the co-operation of the Bureau of Standards.

When all the data were collected and analyzed there appeared to be five causes for the burnouts, which in the order of their importance are as follows: (1) Electrolysis due chiefly to lack of drainage at the time the cables were installed; (2) overheating due to

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*From a paper, "Public Relations," read at the convention of managers of New England companies, New London, Conn., by Mr. Lemmon, as printed in Stone & Webster *Journal*, August, 1921.

*Abstract of paper by K. H. Logan, United States Bureau of Standards.

deterioration of the insulation, caused possibly by mechanical injury to the lead sheaths, possibly by nearness of the ducts to the street surface and possibly by the restriction of circulating air because the duct was too small; (3) chemical corrosion during periods in which the street railway substations were inoperative due to the collection of alkali about the sheaths as the current flowed to them through the earth; (4) surges set up by switching and burnouts; (5) mechanical injuries, etc.

Letters to the Editors

Need of Definition for "Heavy Electric Traction" Suggested

NEW YORK, Sept. 8, 1921.

To the Editors:

The editorial in the issue of your magazine of Aug. 27 on "Wanted, Specific Data on Electric Locomotives" is very well taken, and no doubt will have a very direct bearing in future committee work pertaining to heavy traction matters in general.

With the thought in mind referred to in your editorial, would it not be consistent at this time to undertake some definition or limitation regarding heavy traction electrical engineering? I have in mind matters pertaining to electric locomotives in general. By way of illustration, each month the ELECTRIC RAILWAY JOURNAL will usually have some reference to an electric locomotive either being built or put into service by some steam, electric railroad or traction company. The apparatus may be either a 5-ton, 250-volt mine engine or a 250-ton, 11,000-volt equipment for a steam railroad such as the Pennsylvania or New Haven might use.

Obviously such steam railroads as are interested in freight transportation over long distances and with train tonnages well over 2,000 tons are not interested in the 5-ton, 250-volt equipment. No disparagement is intended of the engineering talent used in the development of the smaller equipment, but it must be admitted that there is a wide difference in the engineering procedure responsible for the two classes of engines. Extending the comparison even further, is it not a fact that in general the railroads of the United States, with the enormous tonnages handled annually and the large units in which this tonnage is moved, have very little, if anything, to learn from European practice in this particular field of electric motive power? For light passenger service and terminal electrification the difference is somewhat less.

If electrification is to bring about the results as referred to in your editorial by "decreasing the operating ratio," it is evident that the size or tonnage of trains must be increased or the running time between terminals must be reduced, or both must be accomplished to bring about an adequate saving as a return in the investment. In either case a larger horsepower or tractive effort must be available at the head of the train. It is self-evident that, if we are to take the present tonnage handled by our larger steam locomotives as a bench mark, we must necessarily design an electric locomotive of considerably larger horsepower than the steam engine which it will replace.

Is it not consistent then at this time to assume a premise for any discussion of "Heavy Electric Traction" based on the above principle? Could it not be consistently shown that an electric locomotive weighing less than 100 tons, or some other similar weight, should not be classed as a heavy traction unit? Likewise, locomotives with axle loads less than a minimum value should not be considered. An overhead system for heavy traction should operate above a minimum prescribed voltage. These suggestions are not intended as a reflection on the engineering deductions which brought about the adoption of any particular system (such as the 600-volt third rail), but more as a basis for classification. As an example, it would hardly be expected that the Pennsylvania Railroad would extend its third-rail system between New York and Philadelphia. It has been conclusively shown that for general use of the electric motive power for freight transportation services over long distances, a much higher voltage and much larger sizes of units must necessarily come into use than those in use fifteen years ago.

If the engineering efforts of the many committees working on heavy traction are to be favorably received by the managers and directors of steam railroads it will be chiefly through the channel of development along the lines of

(a) Larger and heavier freight train units.

(b) Faster freight train schedules between terminals.

If you can, in some manner, start something along the lines above suggested, I am confident that the "heavy traction" subject will be more interesting to the average steam railroad official than it has been in the past.

"ENGINEER, HEAVY ELECTRIC TRACTION."

Making Valuations Under Special Circumstances

NEW YORK CITY, Aug. 22, 1921.

To the Editors:

We have read the recent articles on the subject of valuation, which were written by A. E. Knowlton and published in the ELECTRIC RAILWAY JOURNAL,* with a good deal of interest. Valuation is one of the vital elements in almost every rate determination and our constant contact with proceedings of that character causes us to scrutinize all literature on the subject very carefully.

Mr. Knowlton's point of view is decidedly interesting and the results accomplished were undoubtedly effective. We feel, nevertheless, that the following comment is pertinent.

The study used and required in this case was of a highly organized company managed by exceptionally competent people and having an unusually good record system. It is obvious from Mr. Knowlton's articles that a good deal of the speed and success which were obtained was due to the condition of the records. This is highly creditable to the Connecticut Company and is an example which might be followed to general advantage. It is an unfortunate fact, however, that there are not many, even of the larger companies, which have such well-organized record systems as this company. Another helpful feature in connection with the work was that Mr. Knowlton and his associates were not only familiar with the property but were known to be familiar with it and competent to pass upon the facts. In other words, from the standpoint of expert witnesses, the presumption was in their favor rather than against them.

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*See issue of May 21, 1921, page 947; issue of May 28, 1921, page 985.

Mr. Knowlton and his associates were in the employ of a public service commission which could in a large measure direct the manner in which the facts should be assembled. Its decision was presumably to rest upon those facts, and it probably realized that if the results obtained were even reasonably satisfactory there would be no appeal. The commission was not in the position of a litigant—certainly not in the situation of a litigant meeting opposition of the harassing type which is sometimes met in rate cases. The ordinary company could not rest a case upon general proof such as the commission could employ—in fact, we doubt whether a valuation of this sort would be admissible as evidence at all under ordinary circumstances.

There is no doubt but that the view taken of this problem by the Connecticut Commission was a broad, practical one and decidedly in the interest of securing a generally satisfactory result in a minimum of time. We think, however, that the ELECTRIC RAILWAY JOURNAL has as a duty the necessity of advising its company subscribers against adopting valuation methods of this sort in rate proceedings in which they are litigants. We are fearful that, despite the precedent established in Connecticut, a company which might have a good deal at stake but which attempted to adopt this method of valuation might put itself in a situation where its evidence would not be entertained and that its case would fall.

We do not intend this letter to be a condemnation or even a criticism of the method employed but merely desire to point out that the plan adopted worked in this instance because of special circumstances. The letter is prompted by our constant interest in the electric railway industry and our desire to have those similarly interested avoid any of the pitfalls which we might see. H. C. HOPSON.

Competitive Merchandising Necessary

MILWAUKEE, WIS., Sept. 9, 1921.

To the Editors:

Neither court injunctions nor municipal ordinances nor state laws can or should crush the competitors of the street railway, or prevent the introduction of the jitney, the motor bus, the trackless trolley or other swift and mobile vehicles where public necessity *or public preference* calls for them.

The street railway industry, whimpering in courts, councils and legislatures for protection against the results of its own slothfulness, its own lazy failure to provide the new line of goods demanded by the public, is ridiculous.

Instead of asking to be protected against competition, the industry must get busy and do some intelligent competing on its own account. It can if it will install and operate the new services, supplementing and in part profitably replacing its existing service, more cheaply, efficiently and safely than its shoestring competitors. This is the way and the only way that the street railway industry can be relieved and saved from destructive competition, with the public approval. If it won't adopt this way it will and should go broke and pass out of the hands of its present owners into the hands of city hall politicians. I may add right here that several years of constant knocking of their own business as a business by owners and operators of American street railways has not only damned its credit with investors but has also made city hall politicians shy about asking the public to buy it; even the politicians begin to regard the street railway industry as a white elephant.

As a matter of fact, aggressive merchandising management applied to the street railway business can again make it what it used to be—as dependable a producer of net income as any other utility. FRANK PUTNAM.

More Discussion on Association Reorganization

Shall Other Forms of Transportation Be Admitted?

F. R. Coates, president the Community Traction Company, Toledo, Ohio, has addressed the following letter to a large number of the members of the association, touching upon a very important point. This letter is here reproduced, with Mr. Coates' consent.

THE COMMUNITY TRACTION COMPANY

TOLEDO, OHIO, Sept. 6, 1921.

DEAR SIR: You have received the special report of the executive committee to the American Electric Railway Association covering proposed revision of the constitution and by-laws. If you will refer to the first paragraph on page 8 of the report you will learn that it is proposed, under certain restrictions, to let down the bars of membership to other forms of urban and interurban transportation than that form indicated by the name of our association. Such a movement at this time is prejudicial to our interests and is entirely unnecessary and uncalled for.

We are an electric railway organization and should stand our ground on the foundation we have built. Our method of transportation is not dead or dying, although it has been rather ill the past several years. Why should it not have been, with the kicks and cuffs it has received, and from the unfair competition which has sprung up in many quarters? And are we not ourselves greatly responsible for past conditions? Have we always come out frankly and openly and presented our problems to the public? Has the public always been treated in a manner calculated to make friends?

There are millions of dollars invested in electric railways in this country. Shall we protect this investment, or are we complacently going to watch its dissipation? It is a foregone conclusion that we will protect our interests with all the force and ability at our command. So let us wake up! Instead of affording strength to the other methods of transportation by giving them the opportunity to become members of our organization, let us direct our efforts toward the removal of all unfair competition by having enacted ordinances and legislation which will regulate "other than electric transportation units or companies" similarly as we are regulated. Let us devote our energies toward placing our service, our public relations and our investment on the highest possible plane.

We must face this issue fairly and squarely.

Please give serious thought to the question of admission into our organization of forms of transportation other than our own. Go to the Atlantic City convention and cast your vote so as to insure a continuance of the electrical transportation industry. F. R. COATES.

Equipment and Its Maintenance

Short Descriptions and Details of New Apparatus of Interest to the Industry. Mechanical and Electrical Practices of All Departments

Air Compressor Piston Clearances

Small Clearance Between the End of the Compressor Piston and the Cylinder Head Is Very Important if Efficient Operation Is to Be Maintained

BY F. J. FOOTE
Superintendent of Power, Ohio Electric Railway

THE writer has found that many repairmen, including some very good mechanics, do not understand the importance of keeping the clearance between the end of compressor pistons and the cylinder heads down to the smallest practical amount. One case came to the writer's attention where the clearance by accident was about ⅜ in., and the workman on the job could not understand why the compressor would only pump up to about one-half the normal pressure at full speed.

The reason for keeping this clearance small is to prevent the air left in the clearance space at the end of a stroke from expanding and occupying so large a percentage of the cylinder volume on the return or intake stroke as to reduce the free air taken in. The air left in the clearance space must expand down to a pressure slightly below the atmosphere before any free air will be drawn into the cylinder, and the larger the clearance space the less free air will be compressed per stroke.

The natural law which governs this problem is that for any given quantity of air at a constant temperature, the volume will be inversely as the pressure, or stated in another way: Pressure* × Volume = A constant. For example, if the pressure is doubled the volume will be only one-half, or again if the volume should be doubled the pressure would then be only one-half and so on.

To illustrate this, take the case of a single-acting air compressor with cylinder 5½-in. diameter and 4¼-in. stroke. The piston will have an area of practically 24 sq.in. and will create a piston displacement of 102 cu.in. per stroke.

Let us assume that the actual clearance between the piston and the cylinder head is ⅛ in. and that the space in the parts between the valves and cylinder is also equivalent to this. We will then have a clearance space equal to ¼ in. for the 5½-in. cylinder, or 6 cu.in. Let us assume that the compressor is pumping against 100 lb. gage pressure (114.7 lb. absolute), then the air left in the clearance space will be at 114.7 lb. absolute pressure at the end of the stroke. We will assume that this air must expand down to 14.6 lb. absolute (1/10 lb. below atmosphere) before any outside air will enter the cylinder.

With the above facts in mind let us consider what happens to the small quantity of air confined in the clearance space at the end of the stroke. It has been shown that the volume of this air is 6 cu.in. and that it is under 114.7 lb. absolute pressure. Now applying our law (Pressure × Volume = A constant) we get,

$$114.7 \times 6 = 688.2$$

This 688.2 is then the "constant" for this small quantity of air, and no matter how much the pressure is reduced, by the backward stroke of the piston the pressure multiplied by the volume at any point will equal 688.2. Therefore when the pressure is reduced to 14.6 lb. as above, the volume will be 688.2 ÷ 14.6 = 47.14 cu.in., which is 46.3 per cent of the total displacement, from which we see that little more than one-half of the effective volume of the cylinder is filled with outside or free air per stroke.

If the clearance between the piston and the cylinder head is reduced to 1/32 in., which would be about the proper amount, the clearance in the ports will be the same as before so that we would have a clearance equivalent to ⅛ in. plus 1/32 in. or 5/32 in. Computing the actual volume of the clearance we get 3.75 cu.in. Applying our law to this,

$$114.7 \times 3.75 = 430.1$$

430.1 is then our constant for the quantity of air in this smaller clearance space, and when this air is expended down to a pressure of 14.6 lb. per sq.in. the volume will be, according to our law,

$$430.1 \div 14.6 = 29.6 \text{ cu.in.}$$

which is 29 per cent of the total piston displacement as against 46.2 per cent in the case of the larger clearance. The capacity of the compressor would therefore be increased in the ratio of 17.2 to 53.8, or 32 per cent, by reducing the clearance between piston and cylinder head from ⅛ in. to 1/32 in.

The foregoing proves conclusively the very great advantage of keeping the clearance down to the smallest practicable working limit. Having shown the importance of small clearance, let us go a step further and point out a few of the causes of clearance being too large and the cure for same.

CAUSES AND CURES FOR LARGE CLEARANCE

Cylinder head gaskets may be too thick. The writer has seen rubber gaskets ⅛ in. and 3/16 in. thick used. The obvious thing is to use paper gaskets or something similar to this and get them about as thin as permissible. Rainbow or any other rubber compound is not suitable for cylinder-head gaskets as the oil attacks the rubber and soon ruins it.

Worn bearings and especially worn connecting-rod ends should be avoided. It is the practice in some shops to continue taking up these connecting-rod bearings till the babbitt is practically worn out. When this is done the effective rod length constantly grows shorter as most of the wear comes on the side next to the piston, with a consequent increase in the clearance between piston and cylinder head. A suitable jig for re-babbitting these rods should be provided, and the rods should be re-babbitted whenever the rod bearings show appreciable wear.

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*Pressure here means absolute pressure, which is 14.7 lb. per square inch greater than gage pressure for ordinary altitudes.

A jig for this purpose devised by the writer and used for several years by the Ohio Electric Railway was published in the ELECTRIC RAILWAY JOURNAL for Aug. 20, 1921. This jig is made so as to give the babbitt rod bearings the proper size to fit the crank pin without any machine work and also to make the rod the correct length, thus preventing any mistake being made in the rod length after re-babbitting.

There are some other things that may affect the clearance slightly, but the two mentioned are the most usual causes.

It is very desirable that some kind of test be made on compressors each time they are overhauled to determine if they will pump up to the required pressure in a reasonable length of time. There are various methods, more or less elaborate, for doing this, but where the power conditions are reasonably steady and all compressors the same size, a very simple and fairly satisfactory test is to connect a small reservoir of 15 or 20 cu.ft. capacity to the compressor and note the time it takes to pump up to 100 lb. If this is done on all compressors and a record kept of same, a standard time that should not be exceeded will soon be found.

A more exact and scientific method is to count the number of revolutions of the crankshaft required to pump up the pressure on a given reservoir from 70 lb. to 100 lb. This is particularly advisable in locations where the power used in operating the compressor is variable. I am informed that one compressor maker contemplates the use of a cork gasket, which will probably make it necessary to let the piston extend slightly beyond the end of cylinder at the end of a stroke so that the clearance will be less than $\frac{1}{32}$ in., which is considered to be entirely practical.

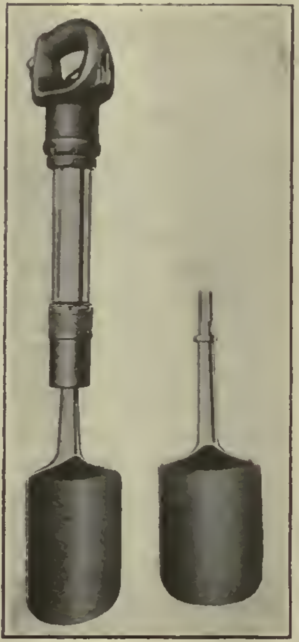
A Crawling Tractor Crane

A CRAWLING tractor crane, manufactured by the Industrial Works, Bay City, Mich., has been developed to meet the use for a full-revolving tractor crane which can be operated independently of rails. The crane is built in two types—the type BC, with a capacity of 20,000 lb. at 12-ft. radius, is equipped with continuous-crawling tractor belts; and the type BT, with a capacity of 18,000 lb. at 10-ft. radius, is equipped with four broad-gage tractor wheels. Having exceptionally large capacities in ordinary lifting, they prove a valuable adjunct in those many erection jobs which are inaccessible to the railroad crane. They can be equipped to handle a hook and block, grab bucket, drag scraper bucket, wood grapple, electric lifting magnet, shovel dipper and piledriver leads with drop hammer. Operation is by means of an internal-combustion engine. When not in operation no fuel is consumed and it is not necessary, as often with a steam-operated machine, to have a licensed engineer as operator.

The steering of the crawling tractor crane while propelling is controlled by the operator, from his position in the revolving upper works, by manipulation of the friction clutches and brakes controlling the motion of each tractor belt. By means of these clutches and brakes either tractor belt can be readily and instantly disconnected from the motor while the other belt continues traveling at the normal rate of speed. The disconnected tractor belt can be held stationary by applying the brake, can be allowed to coast with the brake and clutch both disengaged, or the clutch can be allowed to slip, thus allowing the operator to turn as sharp or as wide a corner as he may select. All the clutches, brakes and lever mechanism for steering are located in the revolving upper works, where they are much more accessible than when a portion or all of this mechanism is located on the car body.

New Pneumatic Scoop

EXCAVATION work in stiff clay, hard pan and fine gravel is ordinarily laborious and expensive where the large steam shovel or trenching machines cannot be used and the material must be loosened for removal by means of the hand pick. An air-driven spade pick has recently been placed on the market by the Ingersoll-Rand Company, New York, to handle this sort of work. It is known as the No. 56-H "Little David" hammer and scoop. The tool consists of a long stroke hammer fitted with special handle and provided with a scoop held in place by a safety retainer. In operation the blows of the hammer drive the scoop into the ground, prying loose the material for removal. The air hammer is of the same rugged type as has proved successful in other work of a similar character, such as picking coal, tearing out light concrete, etc.


AIR-DRIVEN SPADE PICK

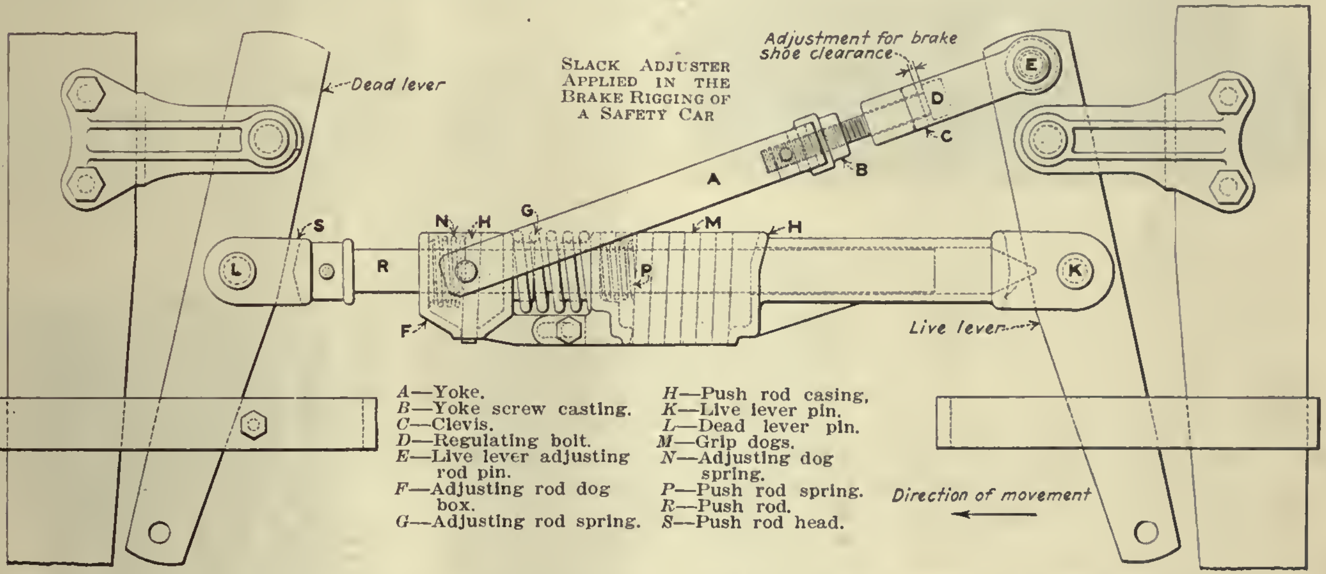
On contract jobs covering both tunnel and trench excavation in clay, these tools have been found to be important labor savers, increasing the rate of earth removal per man from 100 to 150 per cent or more. In one sewer tunnel job in Detroit where the bore is about 9 ft. 6 in. in diameter they are averaging 17 lin.ft. of sewer per day of eight hours with four miners or about 11 cu.yd. per man per day. The material on that job is a medium hard blue clay, fairly stiff, no bracing or timbering being needed to hold the roof.

Mix Thermit Thoroughly Before Using

OCCASIONALLY thermit welders find that they are unable to produce the requisite amount of steel from the thermit which they are using. This is entirely due to the fact that the ingredients (iron oxide and aluminum) have become unmixed. The importance of mixing thermit thoroughly before using cannot be too strongly emphasized, whether a whole bag or part of a bag is to be used. It is logical also, as the iron oxide is in the form of a flake and the aluminum is in the form of a little round ball, that as they are so different in specific gravity, they will segregate in the vibration caused by transit. The bag, therefore, should be dumped and the material thoroughly mixed by hand before putting it into the crucible. In a recent case the Metal & Thermit Corporation, New York, N. Y., investigated the variations in the speed with which thermit reactions took place; this variation was found to be due to segregation of materials and was entirely eliminated by remixing.

Improved Slack Adjuster Construction

In Order to Provide a Simpler Type of Construction and Thus Reduce Maintenance, a Type of Automatic Brake Slack Adjuster Has Been Improved to Meet the Exacting Conditions of Railway Service



SLACK ADJUSTER APPLIED IN THE BRAKE RIGGING OF A SAFETY CAR

A—Yoke.
B—Yoke screw casting.
C—Clevis.
D—Regulating bolt.
E—Live lever adjusting rod pin.
F—Adjusting rod dog box.
G—Adjusting rod spring.
H—Push rod casing.
K—Live lever pin.
L—Dead lever pin.
M—Grip dogs.
N—Adjusting dog spring.
P—Push rod spring.
R—Push rod.
S—Push rod head.

IN THE May 25, 1918, issue of the ELECTRIC RAILWAY JOURNAL, page 1019, a description was given of the Gould type slack adjusters as they had been developed for installation on cars of the Brooklyn Rapid Transit System. Since that time W. H. Sauvage, designing engineer for the Gould Coupler Company, has made further essential improvements in this type of adjuster, and the accompanying illustration shows the latest improved type as applied to the brake rigging of a safety car. This type of construction has been developed in an effort to simplify the construction and to reduce the number of parts, and at the same time to provide a heavy, rugged construction which can be applied to any of the members of the brake rigging of an electric car and provide for automatically taking up any wear which may occur in the brake rigging, brakeshoes, or wheels, and which would otherwise require frequent adjustments to be made in the shops.

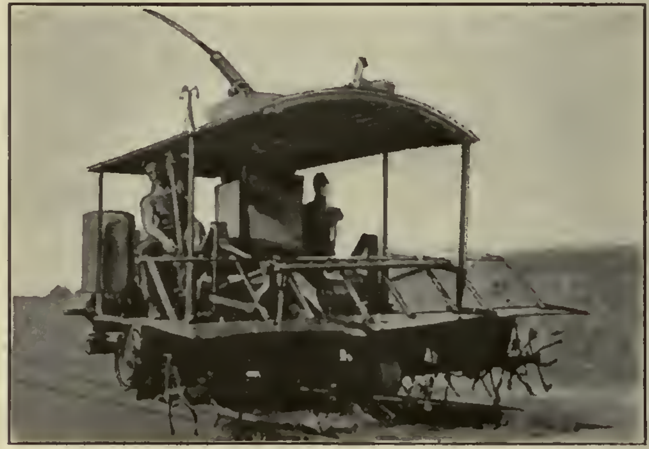
The principal changes in the type of construction which have been made are in the adjusting rod and its method of action. At the same time advantage has been taken in this redesign to use a special steel for the push rod which is acted upon by the grip dogs. In the accompanying illustration, showing this adjuster applied to the brake rigging of a safety car, the adjusting rod details are shown at *A*, *B*, *C* and *D*. With the brakes properly adjusted, an application moves the top of the live lever to the right and the distance between the head of the regulating bolt *D* and the adjusting clevis *C* provided for brakeshoe clearance is taken up, so that the head of the bolt comes into firm contact with the clevis. With all parts in proper adjustment the slack adjuster acts as a turnbuckle between the live and dead levers. When wear occurs at the brakeshoes, wheels, or in any of the brake rigging parts, the head of the adjusting bolt *D* seats on the clevis *C* before the brakes are fully applied. The further movement of the live lever causes the adjusting yoke *A* to move to the right. This causes the adjusting rod spring *G* to be compressed to the exact extent of the excess travel through the movement of the adjusting rod dog box *F* to the right. The adjusting rod grip dog is shown at *H* and this permits movement of the adjusting rod dog box to the right, but grips the push rod firmly and prevents any movement toward the left. As soon as the brakes are released the pressure exerted by the spring *G* due to its being compressed causes the push rod casing *H* to move to the right, thus increasing the distance between the points of attachment to the live and dead levers at *K* and *L*, and the excessive motion due to wear is taken up. Six grip dogs *M* are used on the main push rod. These permit movement of the push rod casing *H* toward the right, but grip the push rod and prevent any movement toward the left. The springs shown at *N* and *P* keep the dogs locked and prevent movement.

In applying the slack adjuster to the brake rigging of a car the distance between the adjusting bolt head and the clevis is adjusted so as to give the desired brakeshoe clearance with a predetermined piston travel. If it is desired to operate with a different piston travel or brakeshoe clearance adjustment can be made by removing the pin at *E* and turning the clevis *C* and the adjusting bolt *D* to lengthen or shorten the distance between the head and the clevis as desired.

The fundamental characteristic of Gould Universal slack adjusters as designed by Mr. Sauvage is the use of grip dogs in place of ratchets or screws to hold the parts in locked position. The improved type as just described operates on the same general lines as adjusters in successful operation on many steam and electric roads for the past fourteen years. Adjusters that require the body and truck brake levers to go into full release position before they operate need powerful release springs for releasing the brakes and operating the adjuster. If these get weak or fail, the adjuster does not operate successfully. The improved Gould adjuster is designed for operation in both tension and compression members and does not rely on release springs for proper operation. The regulating force is applied directly to the adjuster whenever the brakes are applied and all excess piston travel is compensated for immediately after each brake application. The adjustment made is therefore independent of release springs or wear in holes, pins, wheels or brake shoes.

A Gas-Propelled Weed Cutting Machine

THE picture reproduced herewith shows a weed and grass-cutting machine built at the shops of the Texas Electric Railway for use on its interurban lines. The machine is designed to remove grass and weeds growing between the rails and for a distance of 2 ft. 10 in. on each side. This is accomplished by rotating at 1,100 r.p.m. a 3-in. shaft which is attached to a four-wheeled car. The weeds and grass are torn and cut by a series of stiff wire cables spaced 3 in. apart on the shaft and secured with set screws. The motive power for operating the shaft is a 15-hp., 1,200-volt, d.c. motor belted to it. The shaft can be raised or lowered by a series of levers to clear cattle guards and other obstructions.



A WEED CUTTER FROM TEXAS

The car itself is propelled by a six-cylinder gasoline motor taken from a damaged automobile. Located over and parallel to one set of wheels is the motor which drives them through a chain passing over a sprocket on the end of the axle. The car can be run at a speed varying from 4 to 40 m.p.h., but 4 m.p.h. is the average speed when cutting through heavy grass and weeds. Two men are required to operate the apparatus, while the average cost per car-mile is 70.2 cents. This cost includes labor, repairs to machinery, oil, gasoline, etc. The same work performed by hand would cost several times this amount. One of these machines will easily take care of 300 miles of track.

How to Machine Aluminum

THE use of aluminum to an increasing extent in the railway industry to secure lightness of parts has introduced questions regarding proper methods for machining. Some very good practical advice on this subject is given in a handbook published by the British Aluminum Company.

For turning, drilling or milling, a high speed is best and the tool should have acute cutting edges, preferably finished on an oil stone. For the clearance angle of a lathe tool 15 deg. to 20 deg. is advised and with a smaller angle a 5 deg. top rake is given. This top rake should be modified according to the rigidity of the work, as with light work there is a tendency for the tool to dig into the metal. Cutting speeds of about 600 ft. per minute are permissible and a heavier and faster speed may be used than can be used with brass.

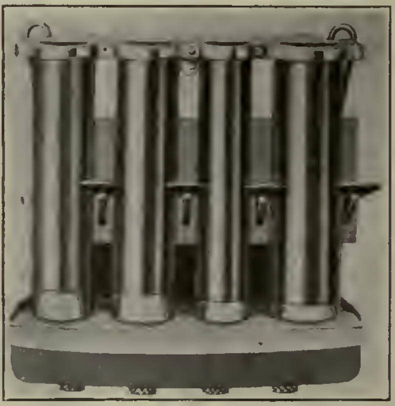
For screwing purposes the British Aluminum Company supplies a special alloy and recommends the use of paraffin as a lubricant instead of turpentine, which tends to leave a resinous deposit and may cause the screw to bind.

In milling the best results are said to be obtained by the use of a built-up tool, the cutters being ground with sharp corners. The cutters should only cut at the extreme points and not have a scraping action as with brass. Cutter speeds of 500 to 600 ft. per minute are used. For grinding aluminum the wheel of any type such as emery, corundum or carborundum should first have a piece of paraffin wax held against it to fill up the pores. The company states that crystolon grinding wheels give best results.

It is advised that filing be done with a single cut file, as other files are plugged easily and require frequent cleaning with a brush. A quick method of cleaning is to immerse the file in a strong solution of caustic soda which dissolves aluminum, but the file so treated must afterward be washed in water and dried in sawdust as it will rust quickly. For finished filing the file should be kept wet with paraffin or even with water.

Adjustable Change Carrier

A NEW change carrier which is to be manufactured by A. F. Nelson, Harrisburg, Pa., and distributed by the Cleveland Fare Box Company, has the particular feature that it can be adjusted to eject from one to five coins of any denomination by simply turning a thumb screw at the base of each barrel. It is a lever-operated changer, utilizing a flat spring made of special non-corrosive metal and bent to the proper form without tempering, instead of the usual steel spring, a feature which it is claimed will eliminate breakage. The carrier is made entirely of liberty silver to avoid rust or tarnish and rather generously proportioned to give a capacity which is said to be 33 per cent greater than any other change carrier on the market. When made up with four barrels it weighs 12 ounces and measures 5 in. wide by 5¾ in. high over all. The barrels are 4 in. long. The top of the device is hinged so that it may be raised more readily to insert coins or for the purpose of emptying all of the coins out of the changer, upon making the turn-in.



NEW ADJUSTABLE-EJECTOR CHANGE CARRIER

The usual location of the barrels has been reversed so that those containing the smaller, more frequently used coins are on the right-hand side. This is claimed to save the conductor from the necessity of reaching across the carrier to the left-hand side many times, lessening his work and quickening change making.

The ready adjustment of the ejector is said to be particularly advantageous when a conductor changes from hand collection to fare box collection in taking out different cars, for it is only a matter of a few seconds to readjust the ejector to fit the case. The device is called the "Rapid Ready-Lever Change Carrier."

Programs of Meetings

National Association of Railway & Utilities Commissioners

THE thirty-third annual convention of the National Association of Railway & Utilities Commissioners will be held in Atlanta, Ga., Oct. 11 to 14 inclusive. The headquarters and place of meeting will be the Ansley Hotel.

The following program is announced:

TUESDAY, OCT. 11

Morning Session: Address of welcome—Thomas W. Hardwick, Governor of Georgia; annual address of the president of the association—James A. Perry of Georgia. *Afternoon Session:* Report by John E. Benton, general solicitor of the association.

WEDNESDAY, OCT. 12

Morning Session: Consideration of reports of standing committees; annual election of officers. *Afternoon Session:* Address by Hon. Joseph B. Eastman, member Interstate Commerce Commission; round-table discussion, topic: "After-the-War Phases of Regulation," chairman, Hon. E. I. Lewis, member Interstate Commerce Commission, formerly State Commissioner of Indiana.

THURSDAY, OCT. 13

Morning Session: Reports of three committees—valuation, litigation and state and federal legislation. *Afternoon Session:* Round-table discussion, topic: "Automobile Transportation—Omnibus and Jitney," chairman, Hon. George McAneny, chairman New York Transit Commission; automobile drive about the city of Atlanta as guests of the Presidents Club of Atlanta. *Thursday Evening:* Annual dinner at Piedmont Driving Club as guests of Presidents Club of Atlanta.

FRIDAY OCT. 14

Morning and Afternoon Sessions: Devoted to reports of committees and discussions; some time during this day the convention will be addressed by M. H. Aylesworth, executive-manager of the National Electric Light Association.

National Safety Council

AT THE Tenth Annual Congress of the National Safety Council to be held at the State House, Boston, Sept. 26 to Sept. 30, there will be meetings of the Automotive Section, Chemical, Construction, Education, Electric Railway, Engineering, Mining and many others.

The first session of the Electric Railway Section, to be held on Sept. 27, will include an address by F. R. Coates, president and general manager of the Toledo Railway & Light Company, entitled "Reflections of the Executives on Safety," and "Rejecting the Grundys from Safety First," a discussion by Miss Laura Roadifer of the Philadelphia (Pa.) Rapid Transit Company. At the second session an address will be delivered by John E. Cullen, United Railways & Electric Company, Baltimore, Md., entitled "The Attitude of the Public Toward the Railway's Participation in No-Accident Week Campaigns." A discussion will follow on "Nationalizing and Standardizing Railroad Crossing and Grade Signs," by R. S. Mesenger, claim agent of the Rochester & Syracuse Railroad, Syracuse, N. Y.

Pacific Claim Agents Meet

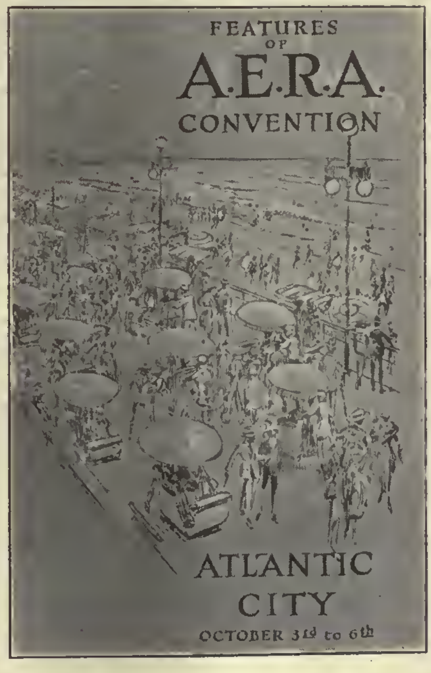
THE Pacific Claim Agents Association held its annual meeting in Butte, Mont., on Aug. 25, 26 and 27, with representatives of most of the leading Pacific coast electric railway companies in attendance. A series of eight papers were presented at the meeting, all covering live questions in the claims department.

The following officers were elected for the ensuing year: President, Frank D. Oaklen, Puget Sound Electric Railway, Tacoma, Wash.; first vice-president, C. M. McRoberts, Los Angeles (Cal.) Railway; second vice-president, P. O. Solon, Tacoma Railway & Power Company, Tacoma, Wash.; third vice-president, J. W. Grace, Sacramento (Cal.) Northern Railway.

American Association News

Convention Entertainment Features

IN AN attractive leaflet just issued by association headquarters, there is outlined in connection with the daily program of the convention at Atlantic City the various entertainment features which have been arranged for the idle hours.



ATTRACTIVE COVER OF CONVENTION LEAFLET

Early birds at Atlantic City will find arrangements for the golf tournament to start on Sunday, Oct. 2, all ready for them. A Sunday evening musical concert at the Marlborough-Blenheim has also been arranged.

On Monday evening the annual reception has been scheduled in the Venetian ballroom, Hotel Ambassador, at 8 p.m., which hotel has been designated as the social headquarters for the convention.

On Tuesday evening a combined dinner and evening meeting have been arranged as previously announced, this also to be held at the Hotel Ambassador, Renaissance Room.

On Wednesday evening in the same room at the Hotel Ambassador will be held the annual ball.

No special arrangements have been made for the last evening, Thursday, but the entertainment committee calls attention to the various attractions at the theaters along the Boardwalk.

As usual the entertainment committee has provided an interesting program for the ladies in attendance at the convention. On Monday afternoon will be held the obstacle golf tournament.

On Tuesday afternoon there will be an informal afternoon tea for the ladies at the Hotel Ambassador, with special orchestra. On Wednesday afternoon the usual ladies' bridge tournament will be held and on Thursday afternoon in the Trellis Room of the new Ritz-Carlton will be held a ladies' tea party. Music will be furnished by Veschey's Parisian band.

The leaflet also contains all of the regular program material, the whole arranged by days. It forms an interesting reminder of the advantages of attending the convention and should tend to encourage those who may at present be in doubt to come to Atlantic City as they should.

Executive Committees Meet at Atlantic City

EXECUTIVE COMMITTEE meetings of the American, T. & T. and Engineering Associations have been called to convene at Atlantic City on Sunday and Monday, Oct. 2 and 3. All of them will be held at the Marlborough-Blenheim as follows:

The meeting of the American executive committee will be hold on Monday, Oct. 3, at 11 o'clock.

The meeting of the T. & T. executive committee will be held on Sunday morning, Oct. 2, at 9 o'clock Eastern standard time, in the committee room on the first floor below the office.

The meeting of the Engineering executive committee will be held in the committee room on the first floor below the office on Sunday morning. Oct. 2, at 11 o'clock, Eastern standard time.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Detroit's Municipal to Buy Canadian Power

Negotiations are being continued between the city and the Hydro-Electric Power Commission of Ontario for the importation of power to Detroit to operate the municipal street railway system. The commission has offered power to the city at $36 per horsepower, but Mayor Couzens is confident that he will be able to obtain it at a lower price than that.

The Mayor intimated that he favored importation of power commencing on a small scale, possibly not more than 10,000 or 15,000 hp. By bringing power in on a small scale at first the Mayor says it would not be necessary to make any great capital investment and the commission could provide the city with 15,000 hp. from the lines already running between Windsor and Niagara Falls.

MAYOR TAKING NO CHANCES

According to the Detroit *Free Press* the Mayor is quoted as saying: "I believe we will do better by importing only a small amount at the beginning. Take any large business and the men behind it will tell you that had they started business on a large scale they would have made a mistake. If we go into this business on a small scale at first, we will make fewer mistakes, and as there is practically no capital investment, we stand no chance of a loss."

When negotiations first started with the Ontario commission, the Mayor believed that eventually it would be possible to provide sufficient power to enable the city to retail it to industrial concerns.

Lightning Destroys Substation

A terrific electrical storm swept over Chicago and the surrounding country in the early evening on July 7 and caused considerable disturbance to the various electric railways. The accompanying picture shows the remains of a portable substation which was destroyed by fire as the result of lightning. This was located on the line of the Chicago & Interurban Traction Company at a point known as Stone Quarry, about midway between Harvey and Chicago Heights, Ill. The car on which the substation equipment was mounted was built with a wood underframe and corrugated iron superstructure. The equipment and car were a practically complete loss. The substation was covered by insurance.

On the same evening lightning caused an interruption in the high-tension power supply of the Chicago, North Shore & Milwaukee Railroad, which was so serious that service was off on the north end of the line from 6 o'clock until the following morning.

PORTABLE SUBSTATION DESTROYED BY LIGHTNING AND FIRE

Labor Men Told What They May Expect

The city administration and the street railway commission will not discuss wages and working conditions until the entire municipal system has been completed, Mayor Couzens recently informed the Detroit Federation of Labor.

The Mayor stated that the street railways now operating did not bring in returns sufficient to pay the bond interest nor the taxes nor put anything aside for a sinking fund and that the city was in no position to discuss wages or working conditions until the whole system was in operation so it could determine its financial situation under the complete scheme.

Chaotic Conditions in Dayton

Immediate Action Necessary if Transportation Catastrophe Not Unlike Des Moines Is to Be Avoided

The electric railway situation in Dayton, Ohio, presents a problem probably unparalleled in the history of Ohio municipalities. The most pressing immediate need is to restore co-operation, such as existed between the operating companies prior to the trainmen's strike in July. There are four independently operated systems in Dayton and they have been rent by dissension since the strike.

AS A result of the difference among the railways, the bus lines, which have been in operation since July, are making a very strong bid for the passenger business of the city, but to date their success has been of no large consequence other than the assistance obtained from the City Commission, which, following the strike, passed an ordinance compelling the railways to reduce fares from 7 to 5 cents.

In addition to the four railway systems, two interurban companies—the Cincinnati, Hamilton & Dayton Traction Company and the Dayton & Xenia Traction Company—operate lines from the heart of the city to the outlying suburbs. The other interurban lines, which merely enter the municipality, are the Dayton & Western Traction Company, the Dayton & Troy Traction Company, the Dayton, Covington & Piqua Traction Company and the Indiana & Eastern Traction Company.

The break among the city railway systems resulted when the People's Railway and the Dayton Street Railway granted their employees 48 cents an hour, instead of 45 cents, which the motormen and conductors on the lines of the City Railway and the Oakwood Street Railway are receiving today. Officials of the latter companies would not yield to the demands of their employees, and as a result many of the men operating the cars on these lines are non-union, while the union is picketing and urging the people not to ride on the cars operated by these companies.

When the men went on strike the Oakwood Street Railway and the City Railway, which is the largest of the four systems, informed their employees that they could not pay them more than 45 cents an hour and that if this pay was not satisfactory the men need not return for work. Following the first day of the strike, the city manager of Dayton informed the officials of the Oakwood and the City Railways that if they did not operate their cars the city would.

Non-union men were employed to

take the places of the strikers, and in twenty-four hours after the city manager's order was issued every car on the lines of these two companies was running. In the meantime the People's Railway and the Dayton Street Railway settled the controversy with their employees, who returned to their posts, after an idleness of four days, for 48 cents an hour. This was 3 cents more on the hour than the motormen and conductors were receiving on any of the other city railway systems. Prior to the strike trainmen employed by the four companies were getting 62 cents an hour.

BUS LINES NOW OPERATING

Immediately following the strike the City Commission licensed bus lines, which are still in operation. These carriers to date have offered most competition to the City Railway and the Oakwood Street Railway, which are the only roads that refuse to recognize the union. The trade of the buses, which are competing with the railways under conditions most unfavorable to the trolleys, is largely drawn from union sympathizers and visitors.

The Oakwood Street Railway probably felt the effect of the strike less than any of the other lines, because 70 per cent of its employees are non-union and the places of the union men were easily filled.

Shortly after the People's Railway and the Dayton Street Railway settled their differences with employees the City Commission adopted an ordinance requiring the operating companies to reduce fares as follows: Adults, 5 cents; children, 3 cents; transfers, 1 cent. Under the old system fares were 7 cents for adults and 4 cents for children, with transfers free. The railways put the new rate in effect on Aug. 27, although the date specified in the ordinance was Sept. 17.

Dayton has not been free in the past from occasional bickerings between the railways and the city, but with the adoption of the commission form of government, which gave the city officials a wider range of action, the railways and other utilities came under fire. In other words, in the public utility industry Dayton has become known as a "tough" town in which to operate. Despite all these hindrances the railways have thus far evaded receivership.

NEW FARE ORDINANCE OPPOSED

W. A. Keyes, president of the Dayton Street Railway, said that the new ordinance regulating fares eventually would mean the confiscation of the company's assets. When the time arrived that his company could no longer operate under the new fare provision, it reserved the right to adopt such a course, without regard to the fare ordinance, as was best calculated to protect the interests of the stockholders.

The railway officials opposed the new fare ordinance on the ground that the City Commission was making no strenuous effort at the time the measure was passed to eliminate the bus lines. The bus lines, according to the traction officials, were to cease operation after the railways had restored adequate transportation service. Today the bus lines are operating on a basis of $11 a month, $10 of which is national tax and $1 city tax.

The railway officials contend that if the City Commission permits the bus lines to operate on the present basis it will drive the railways from the field. On the other hand, the question is raised as to where, in the event they cease to function, is the city going to collect the $250,000 revenue which comes from the railways yearly. In addition to the $250,000 tax, the railways bear a certain portion of the cost of improving streets on which their cars operate. Under the present arrangement the bus lines, for $11 a month, are permitted to operate over streets which the railways help to keep in condition. They are also permitted to do business without indemnity insurance.

COMPELLED TO CUT WAGES

Henry Gebhart, general manager of the Oakwood Street Railway, said that the road was compelled to cut the employees' wages to meet operating expenses. Last year the company, according to Mr. Gebhart, had to borrow money to meet its obligations. Mr. Gebhart said that before the company would continue such a policy it would junk the equipment. In an interview with a representative of the ELECTRIC RAILWAY JOURNAL Mr. Gebhart said:

> The amazing thing is the fact that employees on our road wanted a higher wage on an open-shop basis than the men employed on the line of the Cincinnati, Hamilton & Dayton Traction Company, which is the only strictly closed-shop line operating in this territory.

Another important feature is that no wage agreements are made between the companies and employees. Everything is done by bulletin. The action of the People's Railway and the Dayton Street Railway in granting their employees 48 cents an hour instead of 45 cents did not meet with the approval of the two other city systems. This has caused dissatisfaction on both sides and may prove detrimental to the combined systems at this particular time, when the bus lines are attempting to disrupt this business.

The Bulletin of July 19 setting forth the scale of wages, with arbitration, accepted by the employees of the People's Street Railway follows:

> 1. Properly authorized officials of the company shall meet and treat with a properly accredited committee of the employees upon any and all grievances and complaints, except that of dishonesty, that may arise between them during the life of this bulletin. If an agreement cannot be reached in this manner, the question in dispute shall be immediately submitted to a board of arbitration, composed of three men, one of whom shall be selected by the company, one shall be selected by the employees, both to be selected within a period of ten days from date of notice of submission to arbitration. The third arbitrator shall be selected by the two arbitrators first chosen, provided they can agree within a period of five days; upon failure to agree within the specified time they shall jointly request the appointment of a third arbitrator by the Judge of the United States Court for this District.
>
> When this board is complete they shall meet daily for the consideration of such matters as are properly before them and report their finding promptly in writing to the parties hereto. The decision of a majority of this board shall be final and binding upon the parties hereto.
>
> 2. That all employees of the company shall immediately return to their respective positions as they were on July 5, 1921, without discrimination.
>
> 3. That all regular runs shall be nine hours as near as schedules may permit, and that time and one-half be paid for all time in excess of regular scheduled runs.
>
> 4. All employees to return promptly to their respective posts of duty upon a wage of 44 cents an hour for men of less than three months of service, 46 cents an hour for those of three months and less than one year of service, 48 cents an hour to those of one year or more, for a period of six months; or, all employees of the company shall return to their respective positions as provided above, and without a rate of wages for a period of thirty days, the rates of wages shall then be submitted to a board of arbitration as above provided, who in fixing the award shall give consideration to two points: First, a living wage for the employees; second, the company's ability to pay. The findings of the board shall be for a period of six months from date of resumption of service.
>
> 5. That each conductor shall be furnished with the necessary amount of change for the proper operation of his car.
>
> 6. Negotiations upon a new bulletin shall be opened up thirty days prior to the date of expiration of this bulletin.
>
> 7. The company will, as in the past, maintain the open shop policy. This bulletin and the provisions herein shall be in force on and after July 6, 1921, until July 5, 1922. A modification or repeal of the present fare ordinance will automatically open up the wage provisions herein for adjustment after the six months period stated above.

The same working agreement was accepted by the motormen and conductors on the line of the Dayton Street Railway, although the bulletin is worded a little differently.

The recent strike was a repetition of the one in 1920, when the men were out on all systems for twenty-one days. This year the strike lasted sixteen days, although some of the railways operated cars during the strike controversy.

NEW BUS ORDINANCE INTRODUCED

The City Attorney of Dayton has prepared a new bus line ordinance which if passed by the City Commission will virtually put the bus owners out of business. This measure has been given its first reading by the commission.

The city manager must approve all applications for licenses.

Penalties for violation of the ordinance range from $50 to $500 and imprisonment from ten days to six months.

Bus owners say the license fee, indemnity bonds and front and rear exit provisions of this measure if unaltered will prohibit the operation of buses in Dayton. They are planning to circulate a referendum petition on the ordinance.

Efforts are being made by Charles Mendenhall, City Commissioner, who represents the labor element, to have certain provisions in the ordinance changed, so as to enable the bus line owners to continue operation.

The proposed ordinance becomes operative thirty days after the date of passage.

Wage Decrease Advised

Nebraska Commission Denies Application for Fare Increase and Advises Wage Reduction

The Nebraska State Railway Commission has denied the Omaha & Council Bluffs Street Railway an emergency relief rate of 8 cents, recently requested on account of a decrease of nearly 6 per cent in gross revenue for the year. The company applied for this temporary rate pending the determination of a permanent rate case now before the commission, the hearing upon which was resumed Sept. 12. In its finding on the temporary rate application the commission recommended that the company reduce the wages of trainmen from 10 to 15 per cent. The board of directors of the railway met Sept. 8 and decided to hold in abeyance the wage reduction until R. A. Leussler, general manager, shall have made a thorough survey of wage conditions for street railway employees throughout the country.

On Aug. 10, 1919, the commission authorized the following temporary rates which are now in effect pending the outcome of the application for permanent rates: Cash fare 7 cents or four tickets for 25 cents; children 5 to 12 years, ten tickets for 30 cents; school tickets 5 cents each. The application just denied asked for a cash fare of 8 cents or four tickets for 30 cents, with children's tickets at 4 cents.

CAUSTIC COMMENT BY COMMISSION

The railway estimated that the proposed 8-cent rate would yield increased revenue of $722,725 a year and contended that this sum was required if a fair return on the value of the property was realized. The commission found that the reduction in the number of revenue passengers has been 4 or 5 per cent compared with the same period a year ago, and stated that this rate of loss continued up to the week of Aug. 15, 1921, when the loss was 6.1 per cent.

The following are excerpts from the order of the State Railway Commission, denying the emergency rate of 8 cents:

> Under the estimates based on April. 1921. the net income would have lacked $111,460 of paying the interest on the Nebraska portion of the outstanding bonds, which amount to $10,000,000. The actual interest deficit, January to July, inclusive, was $27,009.19; that is, the company lacked that much revenue to meet its bond interest. On this basis, the total deficit for the year would amount to $49,730.04, which is $61,730 less than estimated. The applicant has outstanding $4,000,000 in preferred stock, covering the property as a whole. Dividends at 5 per cent on this preferred stock would amount to $200,000. This added to the prospective deficit in bond interest indicates a total deficit for the year of $250,000. There is thus presented a serious situation, for the company must, if it maintains its credit, at least pay the interest on outstanding bonds. and it should, if its general credit is to be maintained, be able to pay the dividends on its preferred stock. This is essential to the continuation of good service, and the public for this reason is as vitally concerned in the payment of interest and dividends as are the stockholders and the management.
>
> The applicant asserts that its only remedy is to increase rates again. It is quite obvious, however, that it does not require $725,000 of added money merely to meet interest on the bonds and dividends on the preferred stock. This is an emergency proceeding and applicant stipulates orally that it will accept, as a measure of its immediate necessity, a net return sufficient to pay the interest on its bonds and dividends on its preferred stock.
>
> Consideration of the evidence in this record and of general industrial and financial conditions, of which it must take cognizance, leads the commission to the conclusion that relief for the company lies not in again raising its rates but in reducing, if that be possible, its operating costs. Wages paid labor have receded to a marked degree throughout the country An exhaustive investigation made by this commission during the summer of 1920. prompted by a threatened strike, disclosed that the applicant was at that time paying trainmen wages in most cases as high and in several cases higher than is paid in other occupations of a comparable nature.
>
> The time appears to be ripe, therefore, for action on the part of the applicant looking to a readjustment of its labor costs down to a basis comparable with that experienced by other industries. Laboring men in other walks of life whose wages have been reduced and who are compelled to use the street cars to go to and from their work have a right to ask that wages paid to street railway men be reduced also, if that is necessary to prevent a further increase in fare; this being on the assumption that street railway wages were raised during the period of the war to meet abnormal conditions.

The commission also went on to point out that other economies could be expected as a result of a reduction in material costs, and that if it reduced wages and used a portion of its depreciation reserve allowance, it should be well able to meet its interest on bonds and dividends on preferred stock, making unnecessary the increase in rate which has been asked.

The commission also pointed out that the existing industrial depression, a large number of unemployed and the prevailing discontent were such that it was impossible to estimate or forecast the effect of an increase in fare, were it granted. The increase, unless it were very slight, might result in accelerating the present loss in traffic where added revenue could not be secured, and in its opinion the necessities of the company at this time were not sufficiently great to make it necessary for the company to assume the hazard of such a loss. If, however, the company, after putting into effect the suggested economies, still does not succeed in accomplishing results desired, then the only alternative will be an increase in rates.

In a supplementary expression Thorne H. Brown, member of the State commission, stated: "This utility (the street car company) is second to none in the country in point of service and modern equipment. It has made an enviable record during the period of high operating costs."

Railway Officials at Clam Bake—Edward H. Chapin, vice-president of the National Car Wheel Company of Rochester, entertained the officials of the New York State Railways at a clam bake at his cottage at Conesus Lake near Geneseo, N. Y., on Sept. 1. Upwards of fifty or sixty were present. Last year Mr. Chapin entertained the officers of the same company at a large dinner at his house in Geneseo. A very enjoyable time was had by all on both occasions.

Detroit Ouster Delayed

Merchants Want Issue Put Before People—Other Railway Matters Also Submitted

The proposed ouster of the Detroit United Railway from Fort Street and Woodward Avenue in the city of Detroit has been delayed by the filing of petitions by interested business men located on the thoroughfares in question. The petitioners ask that the issue be put to a vote of the people. Under the provisions of the ouster ordinance passed by the City Council, the company would have had to commence removing its tracks on Sept. 2.

The steps taken by the business men on both streets where franchises have expired are a continuation of the protests against the removal of the tracks, voiced when the ordinance came up for action in the City Council following the company's refusal to accept the offer of $388,000 for the Fort Street and Woodward Avenue lines made by the Street Railway Commission.

The filing of the petitions to put the question on the ballot will delay the ouster proceedings, and has been termed a stumbling block to the municipal program by Mayor Couzens.

OTHER QUESTIONS GO TO VOTE

Two other questions pertaining to street railways will probably be voted on at the primaries on Oct. 11. A resolution has been presented to the Council at the request of Mayor Couzens providing for a vote on a charter amendment enabling the Street Railway Commission of the city of Detroit to acquire, construct or purchase and to own, maintain and operate gasoline motor buses, trackless trolleys or such other type of trackless transportation as may be deemed necessary or desirable for the purpose of supplying transportation to the inhabitants of the city within a distance of 10 miles from any portion of its corporate limits that the public convenience may require, together with all required equipment.

The other question to be incorporated in the amendment is a provision that contracts of construction, purchase or other matters entered into by the Board of Street Railway Commissioners shall not be required to be made through the department of Purchases and Supplies and shall not require the confirmation or approval of the Common Council.

The buses and equipment referred to may be operated either independently of, or in conjunction with the Municipal Street Railway System. This will settle an issue existing among the councilmen as to whether or not purchases for the Street Railway Commission must be made through the Department of Purchases and Supplies the same as for other city departments.

Arbitration of the price to be fixed on the day-to-day lines which the city seeks to take over from the Detroit United Railway was further delayed for additional investigation with regard to the value of materials and equipment involved. The taking of testimony in the hearing relative to the valuation of the 29 miles of day-to-day lines was reported as completed at the City Hall. It is not expected that a final evaluation will be reached or the findings of the board presented for several days.

200,000 Fewer Riders a Day in Cleveland

Further efforts, some of them of the most drastic nature, are being taken by the Cleveland (Ohio) Railway in an effort to end heavy losses the company is incurring by reason of a tremendous falling off in its receipts, due to heavy decreases in the number of car riders.

The company is now carrying 200,000 fewer riders each day than the same time a year ago. During July, for example, the number of car riders for the month dropped to 32,396,891, a decrease of nearly 17 per cent over the number carried in July, 1920. Passenger earnings were $1,382,733. This is a loss of more than 7 per cent over the same month a year previous, although the cash fare is now 1 cent higher than it was then and the ticket rate is ½ cent higher.

As a result of the decrease in the number of car riders resulting in great losses of revenue, the company's interest fund, which is the fare barometer, now shows a deficit of $139,254. It originally contained $500,000 and calls for a fare reduction when it reaches $700,000 and a fare increase when it drops below $300,000. However, the company is now operating at the maximum rate of fare permitted by the ordinance, namely, 6 cents cash, nine tickets for 50 cents, with a 1-cent charge for transfer.

Steps now being taken to curtail the company's losses are:

1. Operation of one-man cars at least on one line.
2. Establishment of a five-day work week for employees in the company's main shops at Harvard Avenue and East Forty-ninth Street.
3. Curtailment of all except vitally essential maintenance work.
4. Further salary and wage reductions now under consideration as well as reduction in the daily hours for shop men from nine to eight hours.

Operation of the one-man cars takes effect on the Harvard-Dennison cross town line beginning Sept. 16. The eighteen cars on that line will be manned by only a motorman. This will decrease the number of conductors by twenty.

So as to prevent any confusion when one-man car operation goes into effect, the company moved the fare box forward and for a week prior to the change the conductor has been collecting fares and issuing transfers at the front end of the car.

John J. Stanley, president of the company, says that if the one-man operation is a success, cars on other lines will be operated in a similar manner.

In July the company's mileage run was 3,026,802, a decrease of 11 per cent. In view of the heavy decrease in travel due to the industrial depression, further cuts have been ordered.

Saginaw's Patience Tried During Fair Week

Five weeks ago the Saginaw-Bay City Railway went into the hands of a receiver. Since then Saginaw along with Bay City, a neighboring comcommunity, has been forced to accept jitney buses as the only means of transportation. "How much longer is this going to last?" has been a question asked many times recently, but the owners of the railway and Otto Schupp, the receiver appointed by the United States district court, have had nothing to say. Apparently the suspension is indefinite.

COUNTY FAIR WEEK

This week the annual county fair is taking place. The traffic has been so heavy that the jitneys and other makeshift conveyances which have been brought into use have failed to carry the crowds. As a result Mayor B. N. Mercer, who has always contended the city should have electric railway service exclusively, has asked all owners of automobiles on the way to the fair to pick up people not so fortunate. In 1920 more than 250,000 persons went through the turnstiles at the fair grounds. The fair management, cognizant of the need for electric railway service, did everything in its power to get street cars running for this week, but the company said it was beyond its jurisdiction to resume service, and the receiver has been out of the city for the past two weeks and could not be reached. Even had Mr. Schupp been in town it is doubtful if a satisfactory arrangement could have been made.

Since the railway suspended the Council has had up for consideration the matter of passing a suitable ordinance regulating the buses, but it has not been passed for the simple reason the members started in to require a suitable indemnity bond for compensation if any of the passengers were injured and the jitney owners said that if the Council passed the ordinance they would ask a referendum on the question. The members of the Council then gracefully backed down.

MAYOR FAVORS INSURANCE

The Mayor took the stand that each bus should carry a policy which would provide $5,000 for the injuries to one person, or $5,000 for one accident. The bus owners claimed the premium was prohibitive. The other members finally agreed to a $25,000 policy for one accident and now matters have reached a point where the Councilmen are about ready to accept a policy of $1,000 for one person and $5,000 for one accident.

Several companies have offered to come into the city and operate motor buses, but as yet nothing has come of these offers. One Detroit concern wanted $150,000 worth of transportation sold in advance, but this was finally disapproved by the board of commerce committee which investigated the proposition. The Imperial Omnibus Company, New York, has forwarded a proposition to establish a line in Saginaw and officials of the company may be invited to present their plan.

Wage Cut in Topeka

Wages of employees of the Topeka (Kan.) Railway have been cut from 7½ to 10 per cent, effective to Dec. 31.

The new wage award in cents per hour is as follows:

	Two-man cars	One-man cars
First six months.......	40	43
Second six months.....	41	44
Third six months......	42	45
Fourth six months.....	43	46
Fifth six months and after	47	50

In a statement issued in connection with the Topeka wage adjustment Judge W. L. Huggins said that the railway property was suffering financially from the jitney competition in the city, that only a very meager return upon its investment was being made. However, living costs have come down 20 per cent since the former wage award of 1920 and that it was on this decrease that the recent cut was based.

10 Per Cent Wage Cut in Fort Wayne

Officials of the Indiana Service Corporation, Fort Wayne, Ind., have announced a reduction in wages effective on Sept. 16 of approximately 10 per cent, affecting practically all employees. A decrease in business, with a falling off in the number of passengers handled on the city lines during the previous month as compared with the same month of last year, is given as the reason for the action.

Robert Feustel, president of the company, in commenting on the reduction, said:

> Our company has been up against the same decreases in business that have affected all other lines of industry. These decreases have been continuous since the first of this year. We have been slow in making the reductions in wages because we were slower than some of the industries in making increases in the past.
>
> Our increases in the past were made regardless of our ability to afford them, but because the increased cost of living made increased wages absolutely necessary. For six months after our increase in fares the Fort Wayne city lines were on a self-sustaining basis, but from March, 1921, the net revenues have decreased rapidly.
>
> There were 225,000 fewer passengers handled on the Fort Wayne city lines in August this year than were transported in August, 1920.
>
> We are making an average cut of 10 per cent, whereas the last increases made in 1920 averaged 25 per cent. With the next scale of wages in effect, 80 per cent of the Fort Wayne city trainmen will receive 50 cents an hour. This rate is still 100 per cent increase over the average trainmen's wages in effect in 1914.
>
> We, of course, cannot tell what the future will do for us, but the best service that it is possible for us to give is the aim of the company. This property must continue the building up process for good service that has been in effect for the past four years if all of our communities are to be well served.

May Electrify Lines.—It was announced at San Francisco on Sept. 6 that William Sproule, president of the Southern Pacific Company, had been authorized by the board of directors of the railway to investigate the feasibility of electrifying the Southern Pacific lines between San Francisco and peninsula points.

Financial and Corporate

Receivership Terminated

United Electric Railways at Providence, R. I., Freed from Receiver—Old Claims Liquidated

By decree entered in the Superior Court on Sept. 6 by Justice Tanner the receivership of the Rhode Island Company, Providence, R. I., has been terminated. The decree directs the receivers to deliver about $1,070,000 in cash and all their books and accounts to the United Electric Railways. The Rhode Island Company, controlled by the New York, New Haven & Hartford Railroad, which set out to control the trolley lines in Rhode Island, went into receivership on Jan. 30, 1919.

The receivers for the railway were Frank H. Swann, Theodore F. Green and Z. W. Bliss. The United Electric Railways at the time the hearing was held controlled the greater portion of all general claims against the estate of the Rhode Island Company and maintained that a continuance of the receivership would be an unnecessary expense.

It appears that the following claims against the Rhode Island Company have been liquidated and allowed pursuant to orders and decrees of the court by William B. Greenough, special master, to whom they were referred:

New York, New Haven & Hartford Railroad	$4,123,411
New England Investment & Securities	593,992
Rhode Island Company 5 per cent secured gold notes	1,696,625
Miscellaneous general contracts and property damage claims	10,707
Other claims	35,148
Total	$6,459,815

The first three classes of claims have been acquired by the United Electric Railways. In addition to the liquidated claims allowed by Mr. Greenough there are now on file and pending before him tort claims to the extent of $3,030,903. Also pending before R. E. Lyman, special master, is a claim of the Sea View Railroad amounting to $1,181,000. An agreement has been reached in regard to this last claim by which it has been acquired by the United Electric Railways.

The outstanding tort claims against the Rhode Island Company estate are said by the receivers to amount, when liquidated and allowed, to not more than $175,000. Of these the United Electric Railways has acquired judgment claims of the face amount of $24,800, and negotiations are pending for the balance of these claims.

General and tort claims not entitled to preferential treatment have been made the subject of an offer on the part of the United Electric Railways to pay 25 per cent, if agreements are made before next April.

Cash in the hands of the Rhode Island Company receivers approximates $1,700,000. All of the properties operated by the Rhode Island Company, except the Union Railroad, Pawtucket Street Railway, the Providence Cable Tramway and the Rhode Island Suburban Railway, were operated at a deficit and the cash now in the hands of the receivers was received from the operation of these properties.

The deed of conveyance, dated Aug. 12, 1921, transferred all the properties purchased by C. H. W. Mandeville under a decree of sale to the petitioning company and the receivers delivered possession to the United Electric Railways at midnight, Aug. 19. The petition before the court for the dismissal of receivers sets forth that the need no longer exists for continuing the receivership.

Bond Issue Offered

Bonds amounting to $600,000 will be placed on sale shortly by the Johnstown & Somerset Railway, Somerset, Pa. The bonds will be in denominations of $1,000 and $500. Somerset county residents recently bought $400,000 of the railway bonds. This makes $1,000,000 up to date against the $1,500,000 voted by the directors of the property when they took up the work of financing building operations about three months ago.

In connection with this bond issue it is said that the company will shortly meet its interest obligations at the Equitable Trust Company, New York, N. Y., the financial agent of the traction concern.

Binghamton Deposit Agreement Changed

Holders of the 5 per cent first mortgage consolidated gold bonds of the Binghamton (N. Y.) Railway have been notified by the Fidelity Trust Company, Buffalo, of certain changes in the bondholders' agreement. The most important change says that "the period of five years is specified as the period in which the depositors will be entitled to the return of the securities which they have deposited hereunder or the receipt of new securities on reorganization or readjustment."

Perry E. Wurst, Buffalo, secretary of the committee, says that inasmuch as the changes materially affect the rights of depositors any depositor may withdraw from the agreement at any time upon surrender of his certificate of deposit and upon payment of 1¼ per cent of the face of each bond deposited. The assessment of 1¼ per cent covers contribution toward the compensation, expenses and obligations of the committee. Those who surrender their certificates will receive bonds to the amount represented by the certificates surrendered.

Steam Line Seeks Electric

Western Pacific Would Formally Acquire Extensive Holdings of California Electric Line

The Western Pacific Railroad has applied to the California Railroad Commission for authority to acquire the Sacramento Northern Railroad properties as feeders to its system and to approve the financial arrangements for consummating the transaction. It is proposed to acquire the Sacramento Northern Railroad through a new company, the Sacramento Northern Railway, organized as a subsidiary of the Western Pacific. The Sacramento Northern Railroad joins in the application requesting authority to sell all of its properties, rights and franchises to the Northern Railway for the sum of $730,000 cash.

The Western Pacific Railroad Corporation of Delaware, which is the owner of all the capital stock of the Western Pacific Railroad now owns more than 97 per cent bonds of the Sacramento Northern Railroad and trust certificates representing more than 95 per cent of the outstanding stock.

The Sacramento Northern Railway now seeks authority from the commission to issue and sell for not less than 100 par 9,950 shares of its capital stock to the Western Pacific Railroad and from the proceeds to obtain the $730,000 to be paid to the Sacramento Northern Railroad for its properties and franchises the remainder to be used as working capital. The Western Pacific Railroad asks to be allowed to use money from the sale of its $20,000,000 first mortgage 5 per cent bonds, previously authorized, to acquire the stock of the Sacramento Northern Railway. the subsidiary corporation in the transaction.

The Sacramento Northern Railroad has outstanding $5,224,373 of bonds and outstanding stock as follows: $1,808,362, first preferred; $793,152, second preferred, and $1,883,382 of common stock, all of which is deposited in trust with the Union Trust, San Francisco. under a voting trust agreement. Under the arrangement approved by the bondholders and stockholders the bonds of the Sacramento Northern Railroad are to be exchanged for Western Pacific Railroad bonds in the ratio of 100 to 80 and the stock is to be purchased at $27.50 a share for the first preferred. $15 a share for the second preferred and $6 a share for the common.

In support of its application to acquire the extensive electric lines of the Sacramento Northern, the Western Pacific states that it is in great need of branches and feeders to furnish traffic to its main line and the present electric system is admirably adapted to its purpose.

The acquisition of these electric lines, it is pointed out, will avoid expensive duplication and the sale will be of mutual benefit as the Northern Electric line is now being operated at a loss.

Interborough Receivership Case Again Postponed

Judge Julius M. Mayer in the Federal District Court Sept. 9 adjourned until Sept. 21 the hearing on the application for a receiver for the Interborough Rapid Transit Company recently made by the Continental Securities Company. Judge Mayer in granting an adjournment said: "In view of the notes being scattered throughout the world and in view of several of the bondholders being out of town on vacation, I adjourn this proceeding to permit deposit of the outstanding notes and shall not appoint a receiver for this company unless it is unavoidable." The previous history of these proceedings was described in the ELECTRIC RAILWAY JOURNAL, issue of Sept. 3, page 376.

James L. Quackenbush, attorney for the Interborough, in reviewing the situation in connection with the three-year Interborough notes maturing Sept. 1 this year, said: "Since the argument a week ago and up to the close of business yesterday 710 holders had deposited notes to the principal amount of $4,432,200 and have agreed to the extension. This brings the total deposits and extensions up to $33,444,100, which is equivalent to 87.68 per cent of the notes outstanding. While this result is most gratifying in the amount of notes represented, the number of depositors, 4,140 out of a total of 7,610 known holders of these notes, indicates that the 3,430 non-depositors for the most part are holders of small amounts."

William D. Guthrie, representing the Empire Trust Company and supporting the Interborough's petition for an adjournment, said that his company is trustee of 97 per cent of the Interborough Rapid Transit stock, composed of 340,000 shares. Elijah Zoklin, attorney for the Continental Securities Company, in opposing an adjournment, told the court that there should be immediate action on the application for a receiver in view of the company's having no funds and was unable to obtain additional securities to satisfy matured obligations. Dwight W. Morrow of J. P. Morgan & Company appeared in behalf of the holders of the 5 per cent bonds and 7 per cent notes of the Interborough Rapid Transit Company. The group of bankers he represented, he said, had no interest whatever in the bonds or stocks of the Interborough Consolidated Company nor had they any interest in any of the New York surface lines. His sole connection with the transit situation in New York City, he said, was as representative of the group of bankers who secured for the Interborough Rapid Transit approximately $200,000,000 in connection with construction of extended subways.

Mr. Morrow added that J. P. Morgan & Company have always been of the opinion that, receivership or no receivership, holders of the 5 per cent bonds and 7 per cent notes will ultimately be paid principal and interest. He was very much averse to a receivership because there are so many small holders of securities to whom the interruption of interest would be a severe hardship and who in fact might be compelled to part with their bonds and notes at a great sacrifice. Therefore, such a result should be avoided if possible.

Increased Fare Has Little Effect on Receipts

The 7-cent fare on the lines of the Louisville (Ky.) Railway put into effect following an injunction granted by Judge Walter Evans scarcely has improved the company's general financial status since Feb. 21, it has been declared.

In the six months period from Feb. 21 to Aug. 25 the increase under the 7-cent fare over the same period in 1920 was approximately $175,000. This is an 8.4 per cent increase in gross revenue, instead of 20 per cent as expected. But the expense for track maintenance, fuel and wages in the half-year period will be approximately $150,000 greater than in 1920, according to officials.

There has been a great decrease in the number of passengers carried during the year. It is estimated that the total number of cash passengers in 1921 will be between 65,000,000 and 68,000,000. In 1920 80,000,000 cash passengers were carried.

Officials said that while it was true that the jitney buses had diverted some of the passengers who formerly rode on street cars, the big decrease could not be explained except as due to general business depression and a consequent curtailment in the number of car passengers. Automobile use also has increased, it was said.

Payments Deferred Until Termination of Receivership

Upon receipt of a letter from George B. Tripp, receiver of the South Carolina Light, Power & Railways, A. B. Leach & Company, Inc., representative of the stockholders, sent out a letter to the noteholders stating that no payment would be made on the $650,000 of 7 per cent notes until the receivership had been terminated, but that it had every reason to believe that within a reasonable time the receiver would be successful in developing the situation so that the property could be returned to the company and a financial agreement made satisfactory to the stockholders.

In the communication to Leach & Company Mr. Tripp outlines the progress of the railway under the receivership, which was authorized in February of this year. The recent increases in fares and power could not be determined at the time of his writing (July 30), but that beginning Aug. 1 it was expected that the net income would show a substantial amount over operating expenses and fixed charges. The receiver also expressed the hope that in September, when the municipal elections took place, amendments could be secured and modifications made in the regulation of electric railway service.

Financial News Notes

Line Operating Again—After being idle for six months over a wrangle to increase fares, the city lines of the Kentucky Utilities Company in Somerset were placed in operation again on Aug. 26, with new cars, and with a 7-cent fare in effect.

Wants to Abandon Another Line—The Pacific Electric Railway, Los Angeles, Cal., has sought permission of the State Railroad Commission to abandon its line between San Bernadino and Arrowhead. The line is more than 7 miles long.

Municipal Bonds for Sale—It will be necessary for the residents of Eureka, Cal., to buy in $25,000 of bonds for the purchase and rehabilitation of the Humboldt Transit Company. The city now has in prospect $105,000 of the required $130,000, the First National Bank having fulfilled its agreement to take that amount. The plans to have the city take over the property have been reviewed previously in the ELECTRIC RAILWAY JOURNAL.

Stockholders Will Be Protected.—Following the application for a receivership for the Interborough Rapid Transit Company, New York, N. Y., a committee was formed to protect the interests of the stockholders of the Manhattan Railway, New York, N. Y. Alvin W. Krech is chairman of the committee. A depositary agreement is in process of preparation under which the Equitable Trust Company will act as the depositary.

Sale Under Foreclosure Postponed.—The sale of the property of the Second Avenue Railroad, New York, N. Y., which was set for Sept. 1, has been adjourned until Dec. 1. The sale was under foreclosure proceedings instituted to satisfy mortgage judgment on its defaulted bonds, amounting to $3,473,511. Part of the property to be sold consists of the carhouse block bounded by First and Second Avenues and Ninety-sixth and Ninety-seventh Streets. The company also has 22 miles of tracks.

Railway Being Reorganized—The Brunswick & Interurban Railway, Brunswick, Ga., now being organized will be the successor company to the Brunswick Street Railway. The new incorporators are all members of the Young Men's Club, who submitted a plan for the operation of the local property. When the final order of sale is issued by Judge Evans it is believed sufficient capital stock will have been paid in to purchase the property and carry out the plans of reorganization. It was announced in the Aug. 6 issue of the ELECTRIC RAILWAY JOURNAL that no bid for the property had been received and that the line would probably be sold as junk.

Traffic and Transportation

Duluth Fights Fare Increase

City Gets Injunction Against Increase and Appeals from the Decision of the Commission

An injunction was granted Duluth on Sept. 10 by the District Court whereby the Duluth (Minn.) Street Railway was prevented from putting into effect an increase in fare granted by the State Railroad & Warehouse Commission. The order of the court is to remain in effect until three judges pass on the merits of the request of the railway.

COMMISSION CUT COMPANY'S DEMAND

The State Railroad & Warehouse Commission, to which the Duluth Street Railway appealed for a 7-cent fare or four tickets for a quarter, denied this request, but ordered a 6-cent fare to go into effect Sept. 1 pending a permanent fare arrangement, contingent on a valuation of the company's property now being made. The railway asked for 6 cents at a time when the high costs of operation were pressing it very hard, but the city refused the increase, the people voting against it twice, although the issue both times was complicated by collateral matter.

Following the decision of the commission, John B. Richards, city attorney, stated that the issue would be taken into the District Court immediately in an attempt to obtain an injunction forbidding the collection of a higher fare until November at least, when the valuation of the property has been finally determined.

In his demand for a stay, Mr. Richards took the position that there was no basis for the claim that there was an emergency within the meaning of the statute. The commission authorized the increase on that basis, while denying that the company needed the 7-cent fare requested in its petition.

Commissioners F. W. Putnam and Ivan Bowen filed a majority order granting the increase, while Chairman O. P. C. Jacobsen issued a dissenting opinion denying the existence of the emergency and suggesting that through the co-operation of the City Council economies might be effected.

CITY WELCOMES DELAY

The entire legal battle is expected to take several months, and such a delay would be welcomed by the city because, by November, Byron C. Gifford, the city valuation expert, will have completed his survey of the company's property and the commission will then be enabled to make its final decision as to a proper fare to be determined by allowing the company a reasonable return on a fair valuation.

In its decision the commission said:

> A fare of 6 cents will produce an increase in revenue of approximately $189,000 per annum. This amount of additional revenue is necessary to enable the company to meet the existing emergency. The commission further finds that the rate of fare of 6 cents cash is a reasonable fare and will not return the Duluth Street Railway more than a reasonable return on the fair value of the street railway property within such city as an operating system.

Legal Battles in Bridgeport

The jitney-Connecticut Company-Utilities Commission controversy in Bridgeport continues to be a legal skirmish with first one side and then the other the victor.

The third injunction since state enforcement agencies commenced carrying out the provisions of the new jitney law was granted the Bridgeport Bus Association by Judge Walsh of the Common Pleas Court. It restrained the police from enforcing the order of the Public Utilities Commission until Oct. 11.

On Sept. 1 the buses were stopped by the police and there followed two days of marking time and this calm was followed by the injunction proceedings. The buses had been operating as free buses or on the club plan but the police arrested the drivers for not having a "J" marker as per the order of the Utilities Commission. After the buses stopped the Connecticut Company increased its service and taxicabs with "O" markers entered into the game.

Following the injunction the jitneys began operating in full force without interference from the police. The status at present leaves the jitneys in possession of the field with tentative moves by the Connecticut Company to quash the injunction.

Chairman R. T. Higgins of the Public Utilities Commission has announced that the commission had tentatively agreed on Sept. 22 as the day for a rehearing on petitions for jitney routes in Bridgeport. The new hearings are to be held in response to a petition of the board of Aldermen of Bridgeport. The petition also requested the commission for a hearing on a reduction of trolley fares, but this matter will not be touched upon in the hearing scheduled for Sept. 22.

Will Not Fight Fare Reduction

At a special directors' meeting held last month it was decided that the Washington Railway & Electric Company, Washington, D. C., would abide for the present on the decision of the Public Utilities Commission which authorized a fare reduction to five tokens for 35 cents effective on Sept. 1.

In a statement giving the company's views on the cut in fare Mr. Ham of the railway stated that the new rates would receive a fair trial though it was conclusively proved that they would not net an adequate return. Meanwhile the directors of the company will look for justice from the public and remedial legislation from Congress in the form of relief from taxation and other burdens.

Albany Jitneys Suppressed

Breach of Injunction Order Held by Judge to Be Criminal Contempt of Court

Supreme Court Justice Harold J. Hinman, in the Albany, N. Y., special term on Sept. 11, fined eleven jitney men $100 each, with the alternative of serving thirty days in jail, for criminal contempt of court in violating his injunction order and announced he would sign a blanket injunction applicable to all jitney operators "who persist in defying the law."

The court, in passing sentence, also gave warning that the punishment meted out for the first convictions will not be the measure of future penalties. This is regarded as the signing of the death warrant for the jitneys that have been operating in territory served by the electric railway. Justice Hinman said:

> Such publicity has been given the fact that the operation of jitneys has been held to be illegal that no person can longer believe he is engaged in a legitimate business in continued operation. There can be no further excuses for violation of the law and persistence must be deemed willful. They have doubtless seen other means intended to enforce the law laughed and scoffed at and fail in its purpose.

A further appeal by the men convicted is considered unlikely. Those represented by Mr. Murray, by the pleas of guilty interposed by him in their behalf, are precluded from taking an appeal. The others, it is pointed out, were in default, because even though they appeared, they failed to avail themselves of the opportunity, given them in the order served on them, to show cause why they should not be adjudged guilty on the evidence contained in the moving papers of the traction company's attorneys.

WILLFUL VIOLATION CHARGED

An appeal to the appellate division may be taken by Mr. Murray, however, from the order overruling his demurrer to the traction company's complaint, on which the injunction order was granted. Such an appeal, however, would have no bearing on the status of the defendants convicted of violating the temporary injunction while it was in effect.

Following the argument on the demurrer to the injunction order, granted against 211 alleged jitney operators named in the application of the United Traction Company several weeks ago, John E. MacLean and J. Stanley Carter, representing the company, presented a petition charging seventeen of the defendants with willful violation of the order forbidding them from illegally competing with the company by operating automobiles without the consent of the local municipalities or a certificate of convenience and necessity, required by section 26 of the transportation law.

Court Prevents Fare Increase in Twin Cities

In both Hennepin and Ramsey County District Courts the order of the Minnesota Railroad & Warehouse Commission granting an emergency increase in trolley fares from 6 to 7 cents, as outlined in the ELECTRIC RAILWAY JOURNAL, issue of Sept. 3, page 380, has been suspended, for further hearing as to the merits of the cases. This means that the Minneapolis Street Railway and the St. Paul City Railway could not put into effect the advance rates ordered effective Sept. 1. The court took cognizance of the cases through appeal by the city attorney in Minneapolis and the Corporation Counsel in St. Paul. The Minneapolis hearing began Sept. 12, the St. Paul hearing will begin some time in October.

Judge J. C. Michael of Ramsey County said that the contention that the finances of the St. Paul company necessitated an increase "seemed to be considerably exaggerated." He said that "no valuation of the railway property was made by the commission and the city's request for a reasonable postponement to enable it to make a valuation of the properties as required by law in such cases was denied by the commission."

O. P. B. Jacobsen, chairman of the commission and the dissenting member when the order was issued, said: "I believe the testimony of the experts introduced by the street railway company failed to disclose any urgent need for an increase in fares at present or until such time as this commission is able to obtain a reliable valuation of the company's property."

Judge E. A. Montgomery in the Hennepin County District Court said:

> In the first place, I hold that the law is constitutional. As to the question of the rate, I do not believe that the evidence before the commission was sufficient to justify the finding that the company was not getting a fair and reasonable return on its investment. I very much doubt whether, under the evidence presented to the commission, any emergency was proved to justify the commission in fixing its temporary increase at this time. I am very clear, however, after reading the order of the commission and all the evidence in the return and all matter presented to me upon this hearing, that there is no emergency existing which would justify carrying into effect the order of the commission granting the street car company an increase to 7 cents. No emergency existing, the fair and just thing to do now is to suspend the order of the Railroad & Warehouse Commission until the hearing of an appeal fixed by the city. I therefore will make an order suspending the operation of the increase until the final determination of the case which is now in appeal is made.

Jitney Licenses Allowed

Pending approval of the Park Board, jitney licenses were issued recently to operators in Tulsa, Okla., over the objections of the Oklahoma Union Railway and the Tulsa Street Railway. The line will run from the post office out Denver Avenue and Easton Street through Owen Park to the monument in Irving Place.

The Oklahoma Union Railway protested that the establishment of the line would probably result in the railway's abandoning its Owen Park service. The Tulsa Street Railway claimed that a jitney line on West Easton Street would cause a cut in service on its Main Street line.

Three-Cent Fare Petitions Filed

Signed by 13,582 names, Councilman Oliver T. Erickson's initiative petition has been filed with City Comptroller Carroll of Seattle, Wash. The petition provides for the maintenance and operation of the Municipal Street Railway out of funds raised by taxation, and payment of interest and principal of the $15,000,000 debt owed by the city to the Stone & Webster interest out of operating revenues only.

Although the proposal makes no specific mention of the amount of fare to be charged on city street cars under this proposed plan, the petitions have been known during their circulation as "Three-Cent Fare Petitions," because that is the fare which Councilman Erickson has estimated would be required to meet the interest payments if all other charges were made to taxes.

Under the city charter, initiative petitions must be signed by 10 per cent of the number of voters who cast ballots for office of Mayor at the last municipal election before such petition can be placed on the ballot. This initiative measure must bear the names of 8,470 registered voters if it is to be voted on at the next municipal election in May, and work of checking over the signers is under way. Councilman Erickson announces that an active campaign in support of this measure will be started early in November under auspices of the Public Ownership League, which sponsored the circulation of the petitions. Following is the petition:

> We, the undersigned qualified voters of the City of Seattle, Washington, propose and ask the enactment as an ordinance of the following bill, or measure, to-wit: An ordinance relating to the municipal street railway system of the city of Seattle, and declaring the fiscal policy of the city in relation thereto.
>
> Whereas, It is to the public interest that the City of Seattle declare and establish a fiscal policy in relation to the municipal street railway system whereby the cost and expense thereof shall be borne, as nearly as may be, by all who benefit thereby; now, therefore,
>
> Be it ordained by the City of Seattle as follows:
>
> Section 1. That from and after the first day of January following the taking effect of this ordinance, all cost and expense of the maintenance and operation of the Municipal Street Railway system of the City of Seattle shall be paid wholly out of the revenues of the City of Seattle derived from taxation.
>
> Section 2. That from and after the taking effect of this ordinance, the City Council of the City of Seattle shall annually, in the manner prescribed by law, provide for the levy of tax on all the taxable property of Seattle sufficient to defray the cost and expense of the maintenance and operation of said railway system for the ensuing year
>
> Section 3. That the cost and expense of maintenance and operation, as used in this ordinance, shall be computed pursuant to, and in accordance with, the requirements of the laws of the State of Washington or of any commission or bureau thereunto authorized by such laws.
>
> Section 4. That there be and hereby is created a fund to be known as the "Extension and Depreciation Reserve Fund," into which the City Council shall set aside, monthly, from the gross receipts of the municipal street railway system, an amount not exceeding 1½ cents for each pay passenger, exclusive of policemen and firemen. The amount thus set aside shall be expended solely for extensions and renewal of track and equipment.

Seattle Jitneys Will Try U. S. Supreme Court

Jitney interests in Seattle recently took the only means left to them to escape temporarily the ban of the city, backed by the final order of the State Supreme Court, when they served notice that they will present to Chief Justice Emmit N. Parker of the State Supreme Court a petition for writ of error to the Supreme Court of the United States. As a result of this action, Chief Justice Parker directed that the final order of the State Supreme Court, vacating the injunction which now protects the Sound Transit Company buses, be held in abeyance until after this petition is heard in Olympia.

The city, expecting receipt of the final order, planned to put it into effect immediately and oust the jitney buses from the street. It was anticipated, however, that the jitney interests might endeavor to prolong their existence by an appeal to the federal court, and the city is prepared to resist this, contending that the case has no federal aspect, as pointed out by all court decisions rendered so far in the city's long battle with the jitneys.

A compromise proposal has been submitted to the City Council by the Auto Drivers' Union, whose buses are at present banished from city streets by the jitney regulatory ordinance, as the union drivers do not enjoy the protection of the McGlothern injunction. The union drivers proposed to limit their operation to long haul lines and to limit the number of buses operating there, where they would be in competition with the railway. The proposition was referred to the public utilities committee.

Twin City Railways Handle Fair Crowd

To handle the crowds that annually attend the Minnesota State Fair, this year from Sept. 3 to Sept. 10, the Twin City Lines placed all the front-exit cars in operation on the interurban trolley line, the fare between the two cities being 12 cents in two payments. Although somewhat confusing to the traveling public because the cars are front exit the first half of the distance and front entrance the last half of the distance between the starting points in the two cities; and pay-as-you-enter for the first half and pay-as-you-leave the second half, the system worked well.

Persons entering the cars between the municipal limits of either city and the neutral zone division line within the limits of St. Paul, on payment of fare received an identification slip which they surrendered on exit. Persons riding the entire distance paid a second cash fare of 6 cents upon leaving. The street railway opened a fixed car loading terminal at the fair grounds this year, which facilitated removal of the big crowd at rush times. The average attendance at the fair was 50,000 daily and a good proportion of the people attending the fair used the street car service.

Public Service Railway's Last Stand

Company Covering Practically All Jersey Fights in Court for Increase in Fare Denied to It by Public Regulatory Body

Federal Judges Rellstab and Davis of New Jersey and Wooley of Delaware in the United States District Court at Trenton, N. J., heard argument on Sept. 13 in connection with the application of the Public Service Railway for a preliminary injunction to enjoin the State Public Utility Commission from interfering with the company in instituting a 10-cent fare. The commission recently denied the company a 10-cent fare and directed it to continue its 7-cent fare, but allowed it an increase from 1 to 2 cents for transfers. This increase the company contends is totally inadequate to its needs and insists that if a substantial fare increase is not granted, it will be forced into bankruptcy.

THE railway was represented by Frank Bergen, general counsel, former Attorney General Robert H. McCarter and Richard V. Lindabury, special counsel. The utility board's interests were looked after by L. Edward Herrmann, general counsel. Attorney General Thomas F. McCran was present for the State, which is a co-defendant in the suit. Newark, Jersey City, Elizabeth and Passaic were represented by counsel who made application to be admitted as co-defendants in order to fight the prospective fare boost.

George L. Record, special counsel for Jersey City, in renewing his application, denied at a preliminary hearing, to have Jersey City admitted as a co-defendant, insisted that the city had an interest apart from the State in the proceedings. He argued valuation was necessary in rate making.

To this Judge Rellstab replied:

> Where a deficit has resulted the valuation cuts no figure. Is that not the opinion of the court of last resort in New Jersey?

In reply Mr. Record said:

> I attack the theory. I say that in normal times there is no decision of our courts where valuation is not the determining factor.

Judge Wooley pointed out that if a number of municipalities were admitted as co-defendants, the issues in the case might be confused in the multiplicity of ideas.

Mr. Record said the company was asking the public to pay the company's business losses, which he contended the directors of the company were solely responsible for.

Mr. McCarter said that Congress had by statute foreseen that the public had an interest in rate making cases and had given their interests into the hands of the attorney general. It was the duty of that official, Mr. McCarter said, to look after the public's interests. He said he noted that the Attorney General, with his assistants, was present.

Mr. McCarter said that the ordinances of Newark and Jersey City fixing fares had been repealed and this fact, he insisted, nullified most of the argument of Mr. Record. He said further that Jersey City could certiorari the rate in the State Supreme Court if not satisfied with it and the same course could be followed by other cities. He objected to the admission of any of the cities in the case except as "friends of the court" by briefs.

Frank H. Sommer of Newark, associated with counsel for the municipalities, said that nothing should operate against the rights of the municipalities to be heard. Judge Wooley speaking for the court said that there was not sufficient time to consider the questions raised and render an opinion immediately, but a decision would be rendered at the proper time.

The main case was then taken up. Mr. McCarter said he would not press at any length the attack on the constitutionality of the New Jersey rate-making law and Attorney General McCran said this would shorten his argument as he was prepared to defend the state statute.

VALUATION TESTIMONY RULED OUT

The court refused to admit as evidence the great mass of testimony taken by the utility board on the question of the valuation of the company's property on which the 7-cent rate was fixed. The court said this testimony could not be admitted as a whole, but intimated that part of it would be accepted if the Board of Public Utility Commissioners would indicate those parts pertinent to the present argument. Mr. Herrmann for the board took exception to this ruling.

Mr. Bergen's brief sketched the organization of the company and pointed out that in the years 1918, 1919 and 1920, "the company earned $1,635,691 less than the amount necessary to pay its operating expenses, taxes and fixed charges and of course nothing on its capital stock of $48,731,600 outstanding." Because of the failure to allow an adequate rate, the railway property had depreciated so that "in the past four years physical property of the plaintiff worth $5,000,000 has been actually taken and used by the public without compensation, and its property is still being taken for that purpose in direct violation of the fourteenth amendment." Mr. Bergen said further that "according to the defendant's own order property of the plaintiff to the amount of $2,000,000 has been consumed since 1917 in serving the public."

Decision of the higher courts of New Jersey and other States, as well as numerous decrees of the Supreme Court of the United States, were quoted by Mr. Bergen, in support of the legal propositions set forth in the brief. He pointed to the O'Brien case wherein the courts held that the company was entitled to an increase in rate sufficient to meet increased costs and added that the utility board's action "in refusing to respect the law as stated in the O'Brien case was emphatically condemned by the Supreme Court of New Jersey," the brief adding: "We have therefore two solemn adjudications of the highest courts of New Jersey in this very matter which entitle the plaintiff to the relief sought by its bill—that is an increase of revenue at once."

Mr. Bergen stated that although he did not think it necessary to discuss or decide the question of the valuation of the company's property on the pending motion, the company was quite willing to meet it. The brief declared that the utility board in arriving at a value of $82,000,000 rejected most of the intangible values and ignored the fact that every consolidation agreement by which the plaintiff was enlarged and every lease now operated "was when made, and still is strictly legal in every particular." It is asserted that the application for injunction is based "on substantial facts which cannot be seriously disputed and rules of law that are settled beyond controversy."

What are declared to be "a few of the important particulars in which the reports of the defendant and the orders based on them are plainly erroneous" are set forth in the brief. Summarized they are:

1. In ascertaining the present value of the tangible property of a utility company by the reproduction method present costs must be used. The defendant recognized this rule of law but added only $12,000,000 to its estimate of pre-war cost of construction which testimony and affidavits demonstrate is much less than should have been allowed. In an affidavit Prof. Henry C. Anderson estimates the difference at $43,000,000.

2. No allowance was made for the value of the contract under which the railway receives current to propel its cars, although the courts have repeatedly held that such a contract is valuable and must be included in the valuation of a utility for the purpose of a base rate.

3. Allowance was not made for "Cost of Money" amounting to millions of dollars, although "no one disputed the correctness of the figures or denied that the expenditure is a legitimate part of the cost of construction of the plaintiff's property." It is pointed out that the utility board excluded this item from its valuation of the property and said it would consider it in fixing a rate of return but failed to do so.

4. The proof shows that $5,000,000 worth of the plaintiff's physical property has been taken for public use without compensation during the last five years and that taking is still going on.

5. The railway owes the electric company $2,500,000 for power which indebtedness was allowed to accrue because the plaintiff was seeking increased rates but if such increase is not allowed the electric company must and therefore will discontinue furnishing power.

6. The experience of the plaintiff from Aug. 4 to Sept. 6 indicates that the income from the additional cent for transfers will amount to $266,911 less per annum than the utility board estimated, and instead of there being an increase of 1.31 per cent in passengers as the board figured, there will be a decrease of 6.94 per cent, making the company's gross revenue $1,999,266 less than the utility board figured it would be.

7. In the O'Brien case and in the more recent case decided last July, the courts of New Jersey have held that the plaintiff is entitled to an increase of rates sufficient to pay for the increased expenses of maintenance and operation and taxes. "No increase in rates allowed by the defendant to the plaintiff since Jan. 1, 1918, has obeyed those decisions."

8. During the past eighteen years the company has expended more than $2,000,000 a year on the average to maintain its property. Such amounts must continue to be spent if the property is to be kept up and the money must be obtained, sixty per cent from a depreciation fund, and

forty per cent new capital. The rates allowed by the utility board do not permit the company to earn any depreciation fund and it will be impossible to get new capital without a substantial increase in revenue.

"The recital of fact could be much extended," Mr. Bergen says in concluding his brief, "but it is unnecessary. From what clearly appears it is manifestly impossible for the plaintiff to continue to operate or to maintain the unity of its property, unless additional income is provided at once and the company protected in the exercise of its rights by the injunction of this Court."

Messrs. McCarter and Lindabury before going into a discussion of the facts pointed out that the plaintiff has an inherent right to appeal to the United States Court for relief. Among authorities quoted sustaining the company's petition were the late Chief Justice White and Justice Peckham of the United States Supreme Court.

In discussing the law and the facts the brief goes into the board's order and report with great particularity and combats the findings therein expressed, supporting the plaintiff's contention with quotations from decisions in similar cases. The lawyers contend that the board's orders and reports are fallacious and altogether wrong and are based on a misapprehension of the board's duty.

After setting forth the general principles involved and treating them and the law applicable to them the special counsel direct their attention to what they term the "improprieties" of the board's report. These are set forth under sixteen headings each of which is discussed in more or less detail and which are as follows:

1. The failure to give to the Ford, Bacon & Davis report the presumptive evidence to which it is entitled by the statute.
2. The board improperly ignored the railway's power contract with the Public Service Electric Company.
3. The board's figure of $12,000,000 for what is called "appreciation" is ridiculously small.
4. The board erred in rejecting as an element of value the amount actually expended in procuring capital required for the work of construction by the plaintiff.
5. The report is obviously wrong in that it allows so little revenue that it will be impossible for the plaintiff to obtain any new capital.
6. The report is wrong in that it makes no provision whatever to reimburse the plaintiff for the deficiency in operation during years 1918, 1919 and 1920, aggregating $1,635,691.
7. The board totally ignored the fact that the railway is indebted to the electric company in the sum of $2,500,000 for power furnished.
8. The board grossly erred in only allowing the sum of $12,000,000 for what it called "going value."
9. The board's treatment of the subject of depreciation of the value of the physical property of the plaintiff is erroneous.
10. The board erred in making no allowance for unearned profits during the past three years.
11. The income purported to be provided by the board's figures assuming their accuracy in all respects is itself insufficient and confiscatory.
12. The board having required in 1918 that the company should annually appropriate $800,000 for depreciation and expenses for replacements and renewals, and being aware that owing to its minimized revenue, the company has only been able during the three years to appropriate $448,002 for the purpose, nevertheless instead of allowing a rate that will promptly make up this deficit spreads it out over a period of five years.
13. The board erroneously concludes that the sum of $715,000 will be annually raised from the additional 1 cent permitted to be charged for an initial transfer.
14. The board has improperly minimized the amount of the plaintiff's revenue that will be required to pay for accidents.
15. The board improperly underestimated the taxes the company will be required annually to pay amounting to at least $100,000.
16. The amount allowed by the board for depreciation and maintenance is at least $1,200,000 less than the sum that must be spent within the next year.

Fare Changes on Michigan Property

A 10-cent cash fare with four tickets for 25 cents and children's fare at 5 cents was put into effect on Sept. 5 by the Michigan Railroad in Jackson and Battle Creek. The same rate was authorized in Lansing except that the cash fare was 8 cents.

The Michigan Public Utilities Commission, in whose hands the matter of a temporary fare was put for Kalamazoo, made the rate for that city the same as Lansing. The commission made an audit and an appraisal of the Kalamazoo property. A hearing has been set for Sept. 21 and an authorized rate of fare is looked for sufficient to pay operating expenses and taxes and to net a fair return on the value of the property.

In Jackson the Mayor appointed a Citizens' Committee for the purpose of establishing a rate of fare, much on the same principle as the commission's plan for Kalamazoo. Lansing will also make an audit of the books and an appraisal of the property.

The story of the fare troubles in the cities in which the Michigan Railroad operates was told in the ELECTRIC RAILWAY JOURNAL for Sept. 3.

Chicago's Eight-Cent Fare Attacked

The fight for a 5-cent fare on the Chicago Surface Lines was renewed before the Illinois Commerce Commission on Sept. 14. For several days preceding this hearing the city attorneys issued statements charging that the companies had been making excessive profits and that the 8-cent fare was unreasonable.

Williston Fish, general manager of the Surface Lines, gave out a statement in which he showed that the $8,237,948 which had been referred to by the city as "profits" for seven months ended July 31 were only the net earnings after deduction of operating expenses. He explained that from this amount the city would get $1,970,997 as its share of the net divisible receipts. Further deduction of $4,809,159 would be made for interest on bonded debt and loans, also $207,083 for sinking fund requirements, and $109,447 for corporation expenses and federal corporation taxes. This would leave net for stockholders $1,141,263.

The amount left after paying the city's 55 per cent would mean a return at the rate of 6.73 per cent per year on the recognized valuation of the properties. In view of declining business it was estimated that the return for the year would not exceed 6.5 per cent. This was identical with the return for the year ended Jan. 31, 1917, which had been referred to by the city as a "banner year" under a 5-cent fare. The fact that the companies will not have a larger return under an 8-cent fare was due to greatly increased wages and material costs. The management insists that a 5-cent fare is impossible and it would only be feasible to grant a 7-cent fare by a drastic cut in the wage scale.

Transportation News Notes

Seven Cent Fare Ends Tieup.—An agreement was reached recently between the City Council of Somerset and the Kentucky Utilities Company whereby the company will charge a 7-cent fare for operation of the railway line. The company discontinued service several months ago because the Council would not grant a 10-cent fare.

Another Bus Line Started—The Connecticut Company recently organized a new bus line in Hartford. The bus had its trial trip on Aug. 27 and carried such distinguished passengers as Mayor Brainard, Chief of Police Farrell, Police Commissioner Cady and others. The bus is No. 16 and starts from Union Station, going over the High Street route.

Bus Line for New Orleans—A local automobile delivery company has asked for a franchise to operate bus lines on the principal streets of New Orleans and has promised to order fifteen buses when a favorable answer has been received. The application states that ultimately they expect to have 200 buses in operation, each one to cost $5,100 and to seat thirty passengers. The proposed fare is to be 6¼ cents.

Improved Service Praised—According to the annual report of the Public Utilities Commission service on the lines of the Washington Railway & Electric Company, Washington, D. C., has been improved by a rerouting scheme and by the addition of a few one-man safety cars. On the subject of jitneys the report states that during the year twenty-seven applications were approved for the operation of jitneys over prescribed routes.

Jitneys Not Very Active—Jitney buses are not causing nearly so much trouble as they did just after the 7-cent fare on the lines of the Louisville (Ky.) Railway went into effect. Drivers have found that there is no money in it, while the city officials are now forcing the autos to quit blocking corners in the business sections, and prosecuting them for violation of traffic regulations, parking laws, etc. A few more weeks and it is believed the jitneys will be out of business.

Personal Mention

L. C. Bewsey Local Manager in Kalamazoo

L. C. Bewsey, electrical and mechanical engineer, has been appointed superintendent of the Michigan Railway Company's lines in Kalamazoo, Mich. At one time Mr. Bewsey was superintendent of transportation of the Buffalo, Rockport & Rochester Railway, which has headquarters at Rochester, N. Y. From 1911 until he went to Rochester, Mr. Bewsey was the local superintendent for the Union Traction Company of Indiana at Indianapolis. Mr. Bewsey was born in Clinton, Ind., in 1882. His first railroad experience was as a fireman and brakeman for the Baltimore & Ohio Railroad and the Big Four Railroad. In 1899 he entered the service of the Lafayette (Ind.) Railway and served as motorman and shop foreman until he became connected with the Union Traction Company. In 1909 when the "Muncie Meteor" was put on by the Union Traction Company, he became motorman and continued in that position until he was appointed local superintendent.

Toledo Claim Agent Elected County Recorder

Arthur D. Hill has just left the Toledo Railways & Light Company to take the position of recorder of Lucas County, Ohio, having been elected on the Republican ticket for a two-year term. Mr. Hill is a much valued member of the Doherty family in Toledo. His rise in the company has been rapid, due both to his ability and capacity for making friends and for always working for the success of the company and the men in position over and under him.

Mr. Hill first became connected with the company in August, 1913, as chief clerk for the claim department. He continued in this work until he went to the Mexican border in June, 1916. After returning from France in 1919 he returned to the claim department, and when the separation of the traction property from the light and power properties came in February of this year he was appointed claim agent for the Toledo Railways & Light Company, the Toledo Beach Company, the Toledo, Ottawa Beach & Northern Railway, and the Adrian Street Railway. He also was in charge of the safety-first work.

His war record has been as brilliant as his success with the company. In fact, he is an old-time military man. He enlisted as a private in the Ohio National Guard in 1895 and was in the military service continuously for over twenty-four years, having served in every grade of the service from that of private to that of major. He commanded the first battalion of the Sixth Ohio Infantry on the border, and after war was declared with Germany and the Sixth Ohio Infantry was made the 147th Infantry, he commanded the first battalion of the 147th in France. It is said that he left the service with the respect and confidence of every officer and man who served under him, an enviable record indeed.

Mr. Coryell in Oklahoma

A. B. Coryell, who at present is superintendent of power for the Laurel Light & Railway Company, Laurel, Miss., has been appointed general superintendent of the Muskogee (Okla.) Electric Traction Company and the Shawnee & Tecumseh Traction Company with headquarters at Muskogee.

Mr. Coryell has a wide knowledge of the utility field, having had more than thirty years' experience in the construction and management of electric railway, light, power and gas properties. He expected to take up his new duties about Sept. 15. His successor has not yet been appointed.

Previous to his present connection in Laurel, Miss., Mr. Coryell was power superintendent of the Port Huron Gas & Electric Company, Port Huron, Mich. Previous to that he was in business for himself in Buffalo, N. Y. During the time that he has had charge of the construction and management of different properties his connections have been mainly in the southern states. He was, however, for four years superintendent and purchasing agent of the Moncton Tramways, Electricity & Gas Company, Moncton, N. B.

C. M. Chandler Again Head of Georgia Railroad Commission

C. Murphy Chandler was elected chairman of the Georgia Railroad Commission for his sixth consecutive term at a meeting of the commission held Aug. 28. Mr. Chandler was elected to this place by unanimous vote of the other members, Paul B. Trammell, James A. Perry, J. D. Price and John T. Boifeuillet. At the same meeting Mr. Trammell was re-elected vice-chairman.

Chairman Chandler has served twelve years as a member of the Railroad Commission until April 1 this year. He was a member of the State Legislature as a representative of DeKalb County when first named to the position twelve years ago. He resigned as member of the Legislature to take up the new duties. He had served six terms in the Legislature.

During his term as chairman of the State Railroad Commission Mr. Chandler has presided over some of the most famous and most important railroad and public utility cases that have ever been considered in Georgia. He succeeded Fuller E. Callaway, of LaGrange, as a member of the commission, and succeeded H. Warner Hill as chairman of the body.

Mr. Trammell was re-elected to the commission last fall. He has presided as vice-chairman in several important cases when Mr. Chandler was absent from the city.

Transportation Commission Now Operating Toronto Railway

With the formal passing of the Toronto (Ont.) Railway into the possession of the citizens of Toronto on Sept. 1, General Manager H. H. Couzens of the Toronto Transportation Commission was appointed general manager of the property and D. W. Harvey, assistant manager of the civic car line, was made assistant manager. R. J. Fleming, former general manager, will continue in the service of the Toronto Railway as operating head of the Toronto & York Radial Railway, which is owned by the Toronto Railway.

The members of the Toronto Transportation Commission are P. W. Ellis, chairman, Frederick Miller, George Wright, and H. H. Couzens.

W. G. Foster now fills the position of auditor of the Aurora, Plainfield & Joliet Railroad, Joliet, Ill. Chester G. Moore was formerly the auditor on this property.

Neill W. Funk, superintendent of the claim department of the Louisville (Ky.) Railway, and son of the late Thomas Funk, for years superintendent of the company, while recovering from serious injuries at his home, had a fall last week in which he fractured his leg. Mr. Funk was in an automobile accident some weeks ago while returning from an outing of the Round Table Club.

R. E. Shartell has been appointed to the organization of the Minneapolis, Northfield & Southern Railway, Minneapolis, Minn., in the capacity of purchasing agent and claim agent. Also, E. T. Selmer has been added to the staff in the capacity of general freight and passenger agent. Art Cutland now fills the position of engineer maintenance of way and roadmaster, left vacant by E. L. Norton.

Robert D. Armstrong, examiner for the Public Service Commission of Indiana, has resigned, effective Oct. 1. He will complete advanced courses in an Eastern law school and return to Indianapolis to practice law. He will be succeeded by Frank Faris, assistant examiner. Mr. Armstrong has been a member of the commission staff since leaving the army at the close of the war. He was also connected with the commission before the war. He has conducted the hearings and prepared orders for the commission in a number of important cases.

W. Harry Stone, who was superintendent of electrical construction and has been with the Los Angeles (Cal.) Railway for many years, has resigned and entered business with his sons. Mr. Stone has taken an agency for art materials, with offices in the Pacific Electric Building, Los Angeles.

M. Holt is no longer connected with the St. Paul Southern Electric Railway, St. Paul, Minn., as auditor. His duties have been taken over by the assistant general manager, C. T. Kuckler.

Edward Flad, St. Louis, Mo., member of the Missouri Public Service Commission since April 15, 1917, has tendered his resignation to Governor Hyde to become effective Oct. 1. He was appointed by Governor Gardner for a term expiring April 15, 1923. His relations with the other members of the commission have always been pleasant, but a desire to return to his old profession of civil engineer had become so strong that he felt he could not resist it any longer. He will return to St. Louis when his resignation becomes effective and resume his profession. His work on the commission has been regarded highly because of his long experience and wide knowledge of engineering.

Obituary

L. D. Howard Gilmour, general solicitor of Public Service Railway, Newark, N. J., died after an operation for appendicitis Aug. 21. Mr. Gilmour had gone to the hospital on the day before and had been attending to his regular work practically up to the time he was taken to Newark from his home at Fair Haven. He was a familiar figure in the state and noted for his kindness and genial disposition.

J. J. Landers, auditor of the York, (Pa.) Railways and president of the American Electric Railway Accountants' Association, died on Sept. 9. Mr. Landers had been connected with public utility undertakings for the greater part of his business career, mostly in accounting work. Mr. Landers was born in 1876 in Bucks County, Pa. At an early age he moved to Philadelphia. He received his education at St. Joseph's College and shortly thereafter entered the employ of the Philadelphia Traction Company, later the Union Traction Company, as chief clerk to the superintendent of power. This position he held until 1899, when he went to Scranton as the chief clerk in the auditing department of the Scranton Railway. In 1903 he was appointed cashier of the Conneaut & Erie Traction Company, then under construction. When operations started he assumed the duties of treasurer and manager. In 1905 he was appointed superintendent of the Rock Hill (S. C.) Light & Water Company, and after two years in the South returned to Pennsylvania as auditor for the York Railways and subsidiaries. Mr. Landers was for three terms vice-president of the Accountants' Association and last year was promoted from the office of first vice-president.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES

BUSINESS ANNOUNCEMENTS

A Flurry in Copper

Shading of Prices, After Attempt to Hold Up Levels, Expected Unless Demand Improves

Copper is slightly more active than it has been for some time with prices still firm. Most of the larger producers are now quoting 12 to 12¼ cents a pound for Lake and electrolytic copper. Inquiries from domestic and foreign consumers are increasing.

During the past week those in control of the copper situation put up their prices ¼ to ½c. per lb., and the others followed in the hope of getting the higher prices, but fearful of the outcome of such a move. As a matter of fact there seems to be no excuse whatever for putting up prices ¼ to ½c. under the conditions prevailing at present. The market has been in a stagnant condition for so long that consumers could not be expected to crowd each other to pay the advances.

The reaction was that domestic consumers showed more interest in the market, and while they had been hesitating somewhat after the advance was made, it is the opinion in the trade that practically all the users are bare of supplies and would find it necessary to get into the market to cover for their requirements.

It is learned that more than one selling interest was in favor of a still greater advance in quotations, but the more conservative interests are opposed to such a move, pointing out that several months ago when the demand was holding comparatively well, a sharp upturn in quotations caused the withdrawal of buyers from the market, and resulted in the lowest quotations on record.

While none of the leading authorities in the industry is looking forward to any great buying movement, it is felt that users having been holding off for so many months will be compelled to enter the market for their needs in the near future, and unless an attempt is made to rush up quotations, it is believed that a healthy and steady increase in buying will be experienced.

The revived interest, however, was short lived, for domestic consumers again withdrew from the copper market and as a result there is some unsettlement in the situation. It is merely a repetition of what has occurred on numerous occasions in the past. Just when consumers appear to be ready to come into the market for fair quantities of the metal some of the big interests insist upon advancing quotations and the result has again been the same, namely, the withdrawal of buyers and the struggle between buyers and sellers for supremacy as to prices.

Domestic consumption so far this year has averaged about 52,000,000 lb. a month, or at the annual rate of about 624,000,000 lb. a year. If no change occurs, therefore, in the rate of deliveries, there will have gone into consumption during 1921 approximately 1,180,000,000 lb. of copper. As near as can be estimated the refinery output of this country for the first seven months of this year, which includes imports of copper matte from South America, aggregated about 560,000,000 lb., or an indicated excess of deliveries over refinery output of about 136,000,000 lb. Carrying this method of figuring a little further, or to include an estimate of the full year on the basis of unchanged monthly refinery output and domestic and foreign deliveries, it is to be observed that indications point to a reduction in the surplus stocks of metal of upward of 400,000,000 lb. Even if the actual refinery output proves larger than it is possible now to estimate, there is also a strong likelihood of increased sales of copper in the last quarter of this year, which, although not immediately translated into deliveries, would have a stimulating effect on the market because of the plain inference of marked reduction in surplus soon after the beginning of 1922.

Under such circumstances it is well within the realm of possibility that something will happen in the copper market similar to that which has recently taken place in cotton. With no increased consumption to speak of in cotton, but with a bearish government report as to the 1921 crop outlook, there has been wild speculation in cotton futures and prices have advanced 85 per cent.

Railway Motor Repair Parts Reduced 10 per Cent

One of the largest manufacturers of railway equipment on Sept. 1 made public a price reduction of 10 per cent in the repair parts for railway motors, controllers and air brakes. This cut also applies to circuit breakers, car switches and fuse boxes. Other manufacturers have not made any definite cuts along this line but claim that their prices are gradually being revised according to changes in labor and raw material prices. Apparently they have not seen fit to bring about a sweeping reduction in an effort to stimulate buying as one has done.

Demand for motor repair parts is, of course, fairly constant and has been of good volume, it is reported. Deliveries are favorable since shipments can be made immediately from stock for parts of standard equipment in general use.

Prices of Overhead Line Material Cut

On Sept. 7 practically all manufacturers of overhead trolley line material announced a price reduction on all malleable iron parts ranging from 2 to 7 per cent. This includes the whole line of malleable iron suspensions, turnbuckles, ears, clamps, strain plates, frogs, etc. No change was made in the prices of bronze and composition material.

Several of the large manufacturers report that there is a very steady demand of this class of supplies, most of the sales going to fill maintenance requirements. Stocks are in good shape and it is possible for buyers to receive shipments of any regularly listed articles in about a week's time.

New Brill Company in Canada

J. G. Brill Company, Philadelphia, announces the formation of a new company for the sale and construction of electric and steam railway rolling stock in the Dominion of Canada. This new company, which is known as the "Canadian Brill Company, Ltd.," has taken over the plant and equipment of the well known Preston Car & Coach Company, Ltd., Preston, Ontario, and has a number of orders now in process of construction.

This plant is a modern car shop having 11½ acres of ground located on the outskirts of the city. Railroad facilities for the shipment of its products to all parts of Canada are provided by the Grand River and Grand Trunk Railways.

The executives of the "Canadian Brill Company, Ltd." are: Samuel M. Curwen, president; H. K. Hauck, 1st vice-president; Alfred Clare, 2nd vice-president; H. D. Scully, general manager and secretary; and E. P. Rawle, treasurer. Mr. Scully, who has been officially identified with many important Canadian enterprises, is located in Preston and, as the resident manager, will direct the operation of this new Brill plant.

Extension of Electrification in Australia

It is reported in the *Times* (London) *Trade Supplement* that the Victorian Railways Commissioners (Australia) are about to convert a further 100½ miles of their lines from steam to electric traction and that the work is to be completed by the end of February, 1923. In addition to this electrification, which covers the passenger carrying routes, a number of lines exclusively used for freight traffic are to be converted and the electric system extended over several of the busier sections of the country lines. This work will entail the overhead wiring of considerably over 100 miles of track, the erection of a number of sub-stations additional to those already in use, the replacement of the existing signaling equipment, and the construction of several workshops fully equipped with machine tools.

Rolling Stock

Toronto (Ont.) Transportation Commission has ordered seven motor buses for experimental purposes during next winter. One bus will be supplied by the Leyland Company, London, England, another by the Eastern Motor Truck Company, Hull, which will be built similar to those operated by the Fifth Avenue Coach Company, New York, while the fourth bus will be supplied by the Associated Equipment Company, London, and the fifth bus by the Fifth Avenue Coach Company, New York. The cost of each bus will average between $13,000 and $14,000.

Franchises

Indiana Service Corporation, Fort Wayne, Ind., has petitioned the Board of Public Works of that city for franchises covering the proposed changes and extensions of the city street car lines on Pontiac Street, Oxford Street and West Main Street. The lines in some instances will be double-tracked and certain of the extensions will require the opening of new streets. A period of five years is asked for in the construction of the double-track lines on Oxford Street from Calhoun Street to Turpie. The company, however, in its petition agrees to complete the Pontiac and West Main Street changes by the fall of 1922. It is stated by the officials of the Indiana Service Corporation that a petition will soon be presented to the board of public works asking that a franchise be granted which will permit the double-tracking of the Columbia Street line to Anthony Boulevard. This work will also be completed before the end of 1922. If the franchise is granted the delay until that time will be necessary in order to permit the completion of the fill at the new bridge over Delta Lake.

Track and Roadway

Claremont (N. H.) Railway expects to re-lay 2 miles of track with A. S. C. E. 70-lb. T-rail with continuous joints, to reclaim 1,500 joints of 60-lb. T-rail with continuous joints and to replace the ties in 3 miles of track with standard chestnut ties.

Mesaba (Minn.) Street Railway has completed most of the road and trackwork on the new right-of-way at Hibbing, and the stringing of trolley wires will be finished shortly. The engineers of the company will provide some means of electric car service although this will be a problem until the new power plant is built in Hibbing.

Portland Railway, Light & Power Company, Portland, Ore., has completed engineering estimates and plans for a $30,000 street improvement job on Third Street, between Washington Street and the approach to the steel bridge at Franders Street. The work involves the complete reconstruction of the track, roadway and paving on the west half of the street, only one side of which will be improved at this time, so as to avoid serious impairment of traffic. The work will require about one month.

Power Houses, Shops and Buildings

Claremont (N. H.) Railway will build a 35-ft. extension to its carhouse. It will also build a workshop 15 ft. x 35 ft.

Cincinnati (Ohio) Traction Company has awarded the general contract for a $30,000 electric transformer station, which will be built on Walnut Street, to the Hazen-Jones Construction Company of Cincinnati. It will be of concrete and steel construction. The improvement, one of a series being built about Cincinnati, will enable the traction company to obtain its motive power from the Union Gas and Electric Company.

The Tokio (Japan) Municipal Railway lost by fire, on Aug. 21, the Hamimatsu-Cho repair shop and carhouse, which is the largest one of the Tokio municipal system. According to information received by Kazutada Sakurai, equipment engineer of the street railway lines in Tokio, who is now in New York, about 100 double-truck cars, principally of wooden body construction, were destroyed. One thing which the meager information so far received does not explain is how such a disastrous fire could occur in this carhouse, which is of the most modern type of reinforced concrete construction.

Trade Notes

William Colin Robinson, vice-president and chief engineer of the Underwriters' Laboratories, died on July 31.

Railway & Industrial Equipment Company, Houston, Tex., has been organized by Arch McDonald, D. L. O'Connor and J. S. O'Connor, and will do business generally in the South, especially in Texas, and also in Mexico, in the line of railway and industrial supplies and equipment.

John A. Roebling's Sons Company, Trenton, N. J., manufacturer of wire rope and other wire products, has preliminary plans under way for a new one- and two-story addition, 500 x 850 ft., for the production of copper and other wire, estimated to cost about $150,000.

The Service Bureau of the American Wood Preservers' Association has just been established, with headquarters at 1146 Otis Building, Chicago. It is intended to make the Service Bureau a headquarters for the source of reliable information on the practice of and the results obtained from the art of wood preservation.

Metals Coating Company of America, manufacturers and distributors of the Schoop metal spraying process, by means of which metallic coatings of any kind may be sprayed onto any surface, is now in full operation at its new plant, 495-497 North Third Street, Philadelphia, having removed from its former locations in Boston, Mass., and Woonsocket, R. I.

The Brush Electrical Engineering Company, Leicestershire, England, lost by fire recently one of its timber sheds containing a valuable stock of seasoning timber for rolling stock manufacture. Manufacturing operations have not been curtailed in the least, nor will any unemployment be caused. The large stocks of cars, buses and similar work in process of manufacture were not harmed.

Dwight P. Robinson & Company, New York, have been retained by the Brazilian Federal Government to supervise a large amount of enginering and construction work in connection with the government's plans for the reclamation of its semi-arid states. This work, which is located in the states of Cara and Parahyba, will include the construction of five large dams, involving nearly a million cubic yards of concrete, to create storage reservoirs. The ultimate importance and economic value of this project is comparable to the irrigation work carried on since 1903 by the United States Government.

New Advertising Literature

Insulators.—The Porcelain Insulator Corporation, Lima, N. Y., is distributing bulletins No. 1 and 2, covering its "Pinco" insulators.

Surge Arresters.—The Electro Service Company, Marietta, Ga., is distributing a four-page pamphlet illustrating the "Bennett" surge arresters.

Resistor Arc Welder.—The General Electric Company, Schenectady, N. Y., is distributing a four-page pamphlet covering its type AW resistor arc welder.

Switches and Accessories.—The Hart & Hegeman Manufacturing Company, Hartford, Conn., has issued catalog H, covering its "H & H" barrier 600-volt switches and all types of switches and accessories.

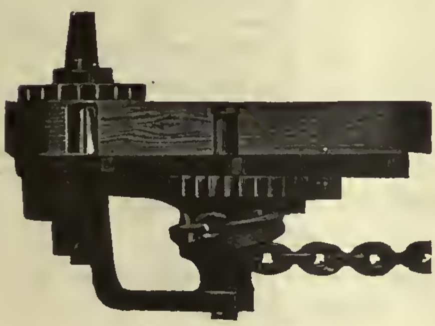
Safety Starting Switches.—The Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., is manufacturng a switch with quick-make and quick-break action, known as type WK-55, for both alternating-current and direct-current motors.

Small Motor Starter.—A new type of motor starter, the WK-30, has been developed by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., for starting small alternating-current motors by connecting them directly to the line.

You can make the old car do a little longer

Heavy and sluggish, hard to stop quickly, and sometimes figuring in costly accidents, those old hand brake cars are a problem under modern operating conditions, aren't they?

But with a trifling effort and outlay you can effect a wonderful improvement by ripping out the worn down, inefficient, never-satisfactory hand-brakes and installing



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There is a size and type for every type of car.

For Example
Peacock Improved 15/49

For single-truck cars over 26,000 lbs. and double-truck cars between 30,000 and 35,000 lbs. in weight.

Will make quicker stops, thereby improving schedule speed and reducing accident hazards.

If you must continue to operate old cars, modernize their brakes.

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Try to convince an experienced buyer of Electric Railway equipment that the good old proverb "A penny saved is a penny earned" always holds good and you'll have an argument on your hands.

He'll tell you that a penny saved is *not always* a penny earned—that very often it means *a dollar lost.*

Men who have bought axle and armature bearings on the penny saving basis have learned to their sorrow that cheap bearings are poor economy—false economy. They have learned that *service* is the real test of a bearing—service that guarantees slow and even wear—correct bearing alignment—greater mileage—decreased wear on axles and journals.

That's why the *most careful* buyers—the *most economical* buyers—the buyers who save the *real* money on equipment, invariably choose More-Jones "Tiger" Bronze Axle and Armature Bearings. They have learned from experience that in the long run they are by far the most economical.

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Bronze
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Everywhere pole-buyers are enthusiastically receiving the P&H Guaranteed Penetration Process as the first and only process of Butt-Treatment that bears a definitely guaranteed result.

They recognize in the Guaranteed ½ Inch Uniform Penetration throughout the ground-line area of the pole the long-waited-for means of safe-guarding their investment in poles.

They see in the P&H an assured "Dollars and Cents" return in savings effected throughout their entire systems of transmission lines. They see direct saving in:

Longer Life For Poles
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Accept no substitute process of Butt-Treatment.
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GUARANTEED
One-Half Inch
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This disc countersunk on the butt-end of every pole Butt-Treated by the P & H Guaranteed Penetration Process is your assurance of one-half inch penetration.

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Steel Tires

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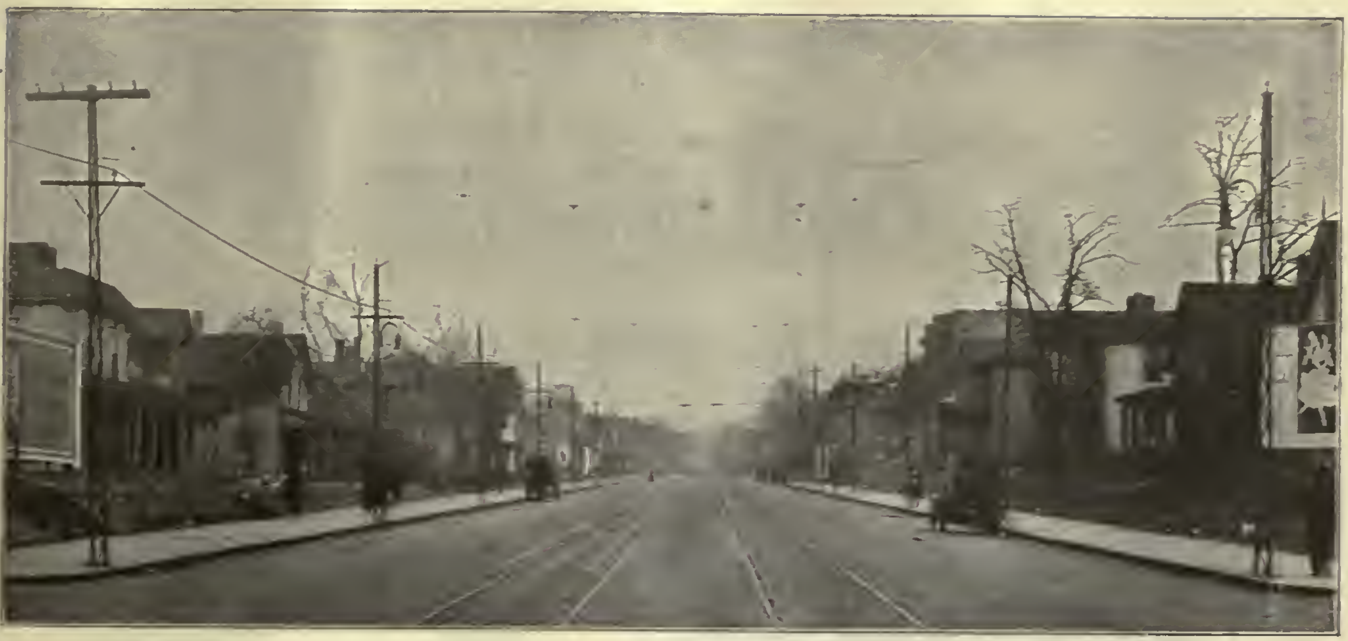

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We are now packing our insulators in cartons

No mussy sawdust
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Try some of our insulators. They all have a very uniform brown glaze, a very distinctive color, no black spots or discoloration.

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The Big Chip Tells the Story

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THE high production of which this machine is capable is largely due to the center driving construction with powerful herringbone gear having automatic quick-acting hinged segment to admit the axles.

Additional time- and labor-saving features include semi-automatic drivers, pneumatic tool clamps, pneumatically operated tailstocks, push button motor control.

N-B-P Center Drive Car Wheel Lathe

We are in a position to furnish complete machine tool equipment for electric railway repair shops, including car wheel lathes, wheel presses, axle lathes, car wheel borers, etc., as well as steam forge hammers, engine lathes, boring and turning mills, etc., and the electric travelling cranes to serve them.

NILES-BEMENT-POND CO.
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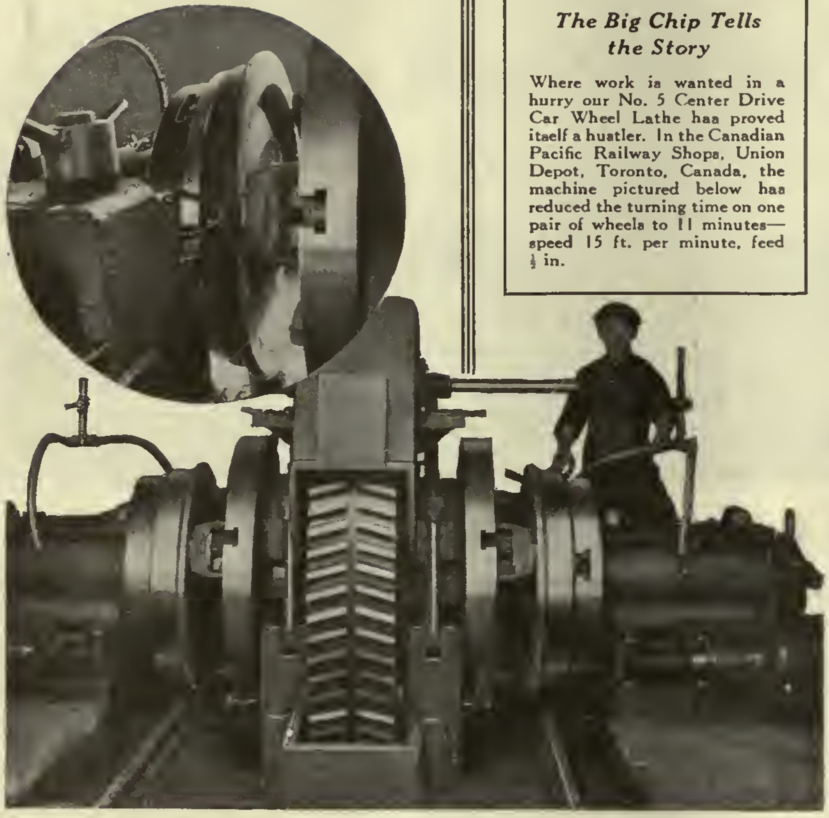

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Eureka Equipment will help to keep down maintenance costs because it is correctly designed and carefully manufactured from our own special alloys.

We can now make prompt shipments on

- Commutators
- Trolley Wheels
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Harp or wheel changed in ten seconds, or a pole in less than a minute. No tools—only your hands. All lubricating, adjusting and repairing done at the work bench. No delays to car schedules. That is why *all large users* of One-Man Cars use the Bayonet. It is not only a great time saver, but it is unsurpassed for efficiency and economy. Try it for 60 days. You must be satisfied or the equipment is ours. Get ready for heavy traffic.

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T.S.Q.
says
"I sold my services
on guaranteed efficiency.
The chief has never
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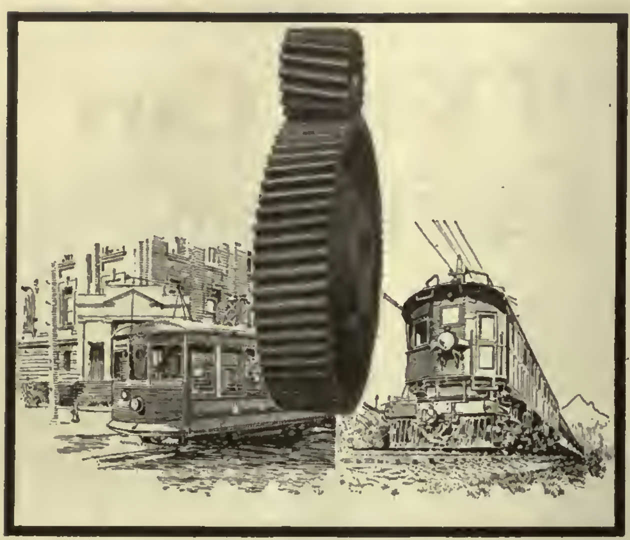

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Nuttall Helical Gearing, manufactured since 1914 in a constantly increasing volume, has conclusively demonstrated its superiority in every class of railway service.

This superiority is due to the following characteristics of Nuttall Helical Gearing:

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"The Birthplace of the Safety Car"

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TRENTON TOWER

is not only more convenient, but stronger than the older type.

The top section is reinforced by the intermediate section. The 3-section design makes it possible to raise the platform 16 inches higher and drop it 12 inches lower than can be done with the old-style 2-section tower.

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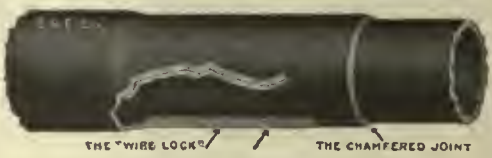

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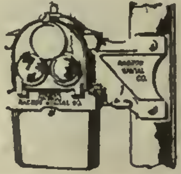

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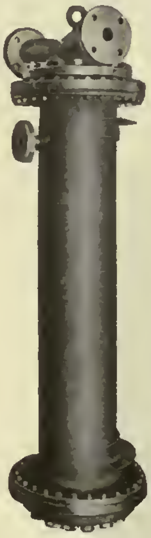
Catalog 10-F



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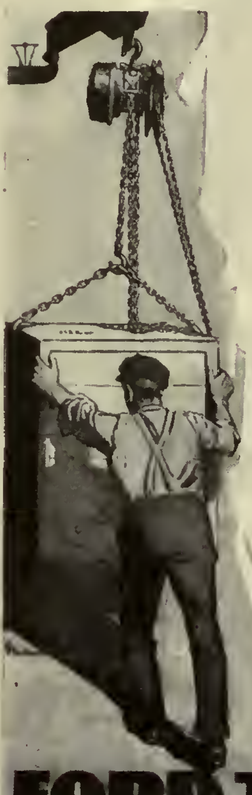

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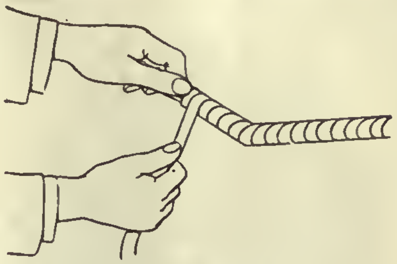

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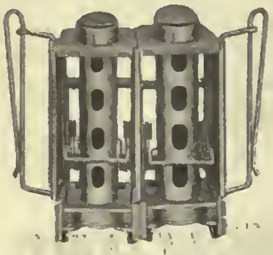

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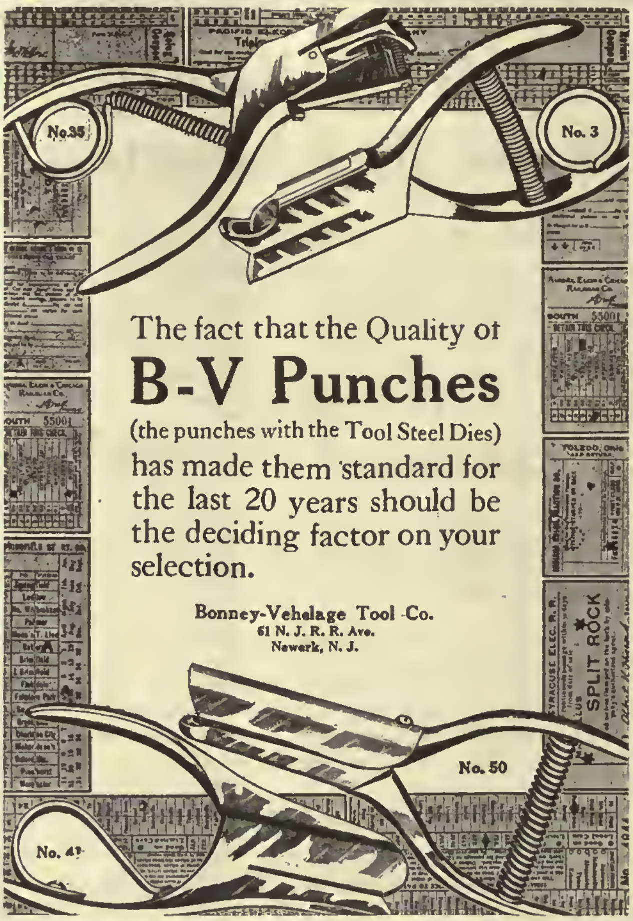

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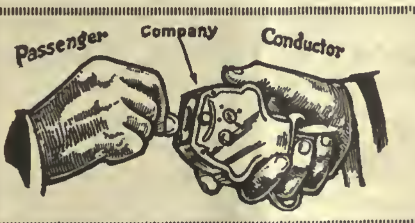

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2—300 kw. 25 cycle, 3 phase, ROTARY CONVERTERS 360 volts A.C. 600 volts, D.C., 500 r.p.m. with 15000/360 volt transformers. Will sell with or without the transformers. Can sell at very low price.

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Horne Mfg. Co.
Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Armature Shop Tools
Elec. Service Sup. Co.
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Brill Co., The J. G.
Axles
Bemis Car Truck Co.
Cambria Steel Co.
Midvale Steel & Ord. Co.
St. Louis Car Co.
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Brill Co., The J. G.
Standard Steel Works Co.
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Ajax Metal Co.
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Amer. Steel & Wire Co.
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Allis-Chalmers Mfg. Co.
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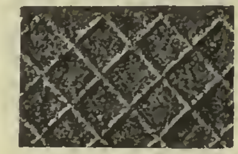
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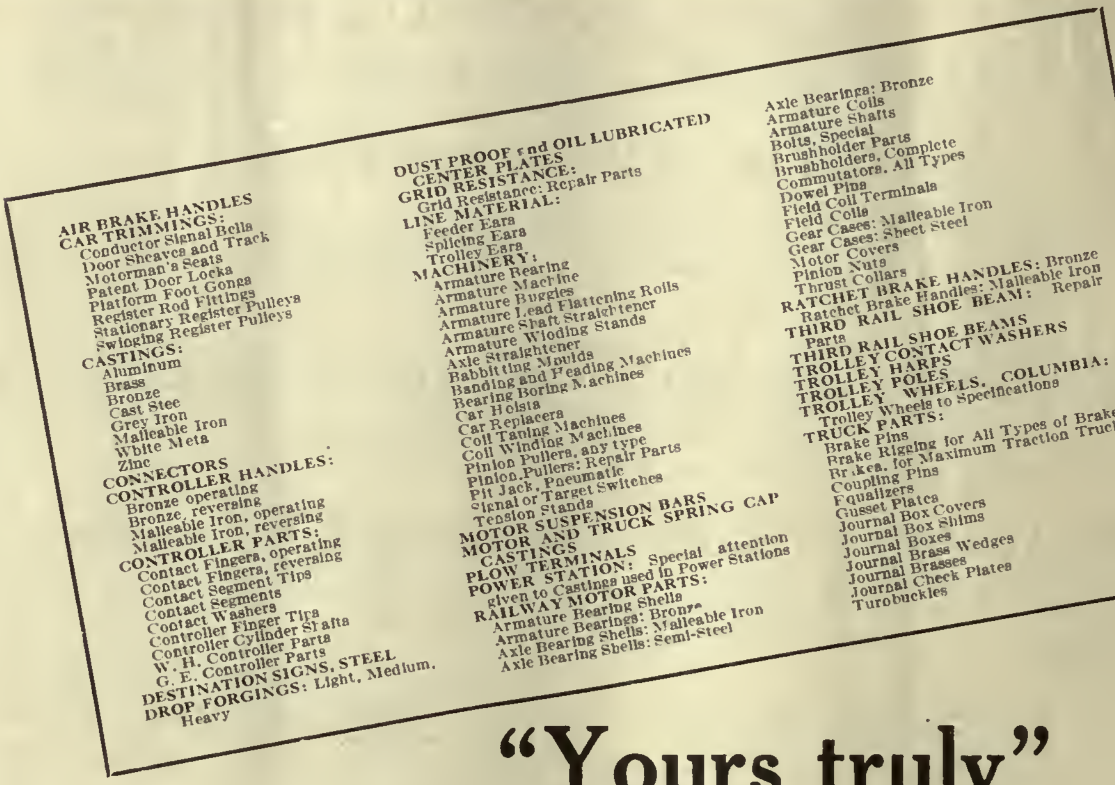

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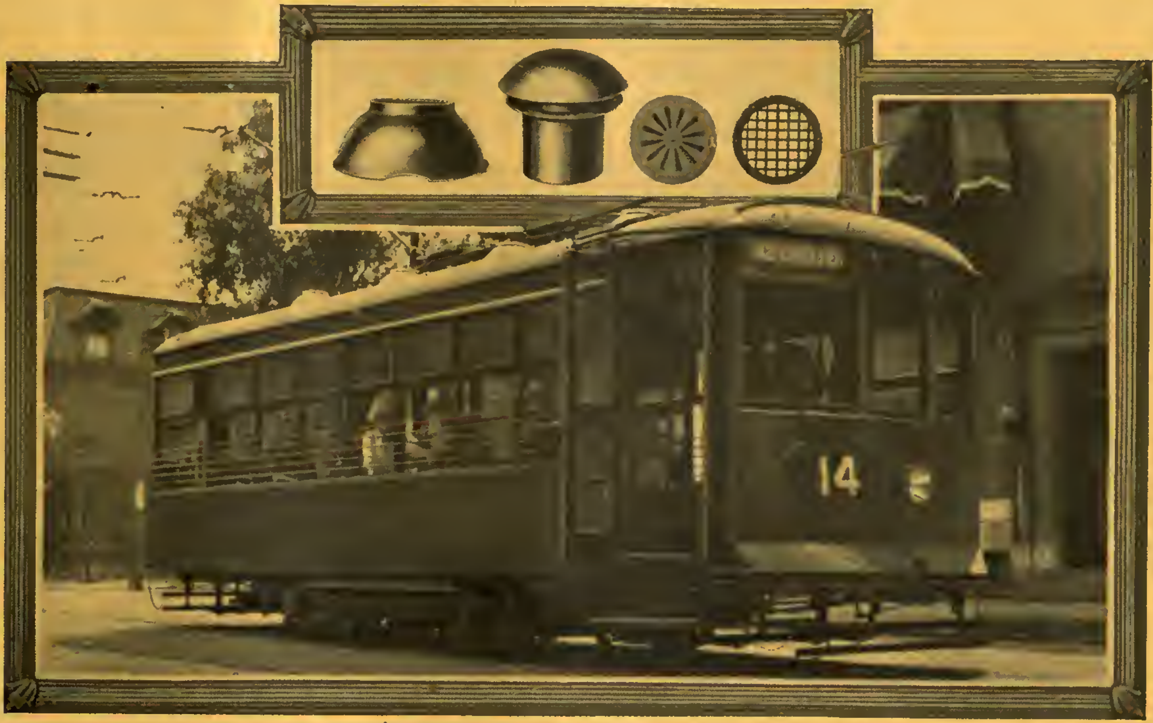

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"Sell More Rides"

The technical press and the manufacturers interested in the prosperity and growth of the Electric Railway Industry all join in the chorus urging the Electric Railways to SELL MORE RIDES. Sell the service the railway company has to offer to the people. Railway operators doing their utmost along these lines have patiently listened to this advice because they know it is well meant and helpful.

Trolley-Bus.

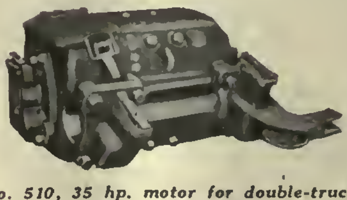
The Westinghouse Company is, and has been since its conception, vitally interested in the development and prosperity of the Electric Railway Industry. Many thousands of dollars are appropriated annually for the development and improvement of apparatus that will be helpful to the industry, and ultimately result in increased business for both the company and the railways.

Light-weight 29,700 pound car of the Monongahela Valley Traction Co.

Notwithstanding the general retrenchment forced upon the electric railways during the past several years, the Westinghouse Company, having confidence in the integrity and ability of the operating fraternity, and also in the soundness and stability of the electric railway as the most economical and feasible mode of mass transportation, has continued to prosecute development and improvement of apparatus and appliances right along and is, therefore, as always, ready to do its share of the rehabilitation work that lies before the industry.

Light-weight cross-town car in St. Louis, Mo.

Much has been said of late about other methods of transportation—the auto bus and the trackless trolley-bus. Those who have studied the problem know there is a wide field of usefulness for both the auto-bus and the trolley-bus. Westinghouse



No. 510, 35 hp. motor for double-truck, light-weight cars.

W
WESTINGHOUSE ELECTRIC

engineers have been studying the possible use of trolley-buses for several years and have available up-to-the-minute equipment developed for such applications.

The use of auto-buses, or trolley-buses, in the regular transportation field, however, should not be construed as indicating that these modern instruments of transportation will ever encroach on the field of the standard modern electric railway car; in fact, they are regarded by many as a welcome incentive which will bring about more rapid development of the standard electric railway car and equipment which inherently possesses all of the fundamentals necessary for the economical, reliable, safe, and rapid handling of mass transportation, which none of its competitors possesses at present.

In order to help *"SELL MORE RIDES"* at a reasonable profit, the country needs, in addition to the standard safety car, a universal standard light weight, yet rugged, double-truck car, not to exceed 27,000 to 28,000 pounds, completely equipped, which may be successfully operated with one man on light routes, with one man and a fare collector on heavier routes, and as multiple-unit train during rush hours.

The Westinghouse engineers appreciating this situation have, during the year, developed a new size, light weight 35 hp. motor, suitable for such cars and, in addition, have perfected HL control and many other safety appliances, all of which will tend to increase reliability and lessen upkeep cost.

The Safety Car has clearly shown that frequent and quick service will *"Sell More Rides."* Its success everywhere throughout the country proves this conclusively. Westinghouse engineers, appreciating this, brought out the now famous 508 Safety-Car motor. Its performance everywhere is the best evidence of its superiority over all others.

Safety Car.

No. 508, 25 hp. Motor for Safety Cars.

Multiple-unit train for surface lines of the Boston Elevated equipped with HL Control.

Interurban train of the Chicago, Milwaukee & North Shore R. R.

WESTINGHOUSE ELECTRIC

Marketing Interurban Transportation

The interurban road, in order to be successful, must market its transportation services to the fullest measure right along, day in and day out. It must acquaint the people with its facilities and fully inform them of its advantages and induce them by effective sales methods to make use of their lines in preference to all others.

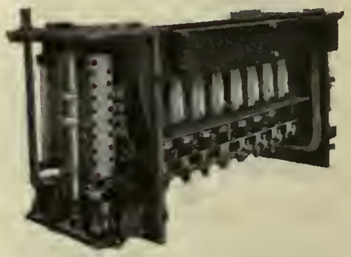
Westinghouse engineers have conducted special studies on interurban development for a decade and as a result are in a position to offer passenger and freight equipment that is unexcelled for all classes of service.

The No. 306-CV-4 motor, 65 hp. and HL control for light-weight interurban. The No. 548, 100 hp. for medium-weight interurban. The No. 333-V for heavier interurban and the No. 557, 140 hp. for high speed standard, heavy interurban service. Such leading interurbans as the Chicago, Milwaukee & North Shore; The Lake Shore Electric; The Pacific Electric; and the Lackawanna & Wyoming Valley, and numerous others have adopted this motor with HL control. Standard 40, 50 and 60 ton Baldwin-Westinghouse locomotives will be found in use on those electric railways which have built up a freight business and are earning money and aiding immensely in the relief of traffic congestion in their respective communities. Standard locomotives provide the most economical means of rail transportation when properly selected.

Renewal parts and accessories for railway equipment, items of vital importance to all operators in the maintenance and upkeep of existing rolling stock, receive the same thorough consideration by Westinghouse designing and manufacturing engineers as does the production of complete equipments.

No. 306, 65 hp. motor for city and suburban service.

No. 557, 140 hp. motor for interurban service.



HL Control Box for multiple-unit operation, and for locomotives.

Freight car of Detroit United Ry.

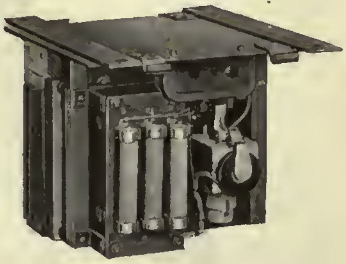
Baldwin-Westinghouse 50-ton Locomotive.

All renewal parts are produced under the same careful processes and with the same tools as those for complete equipments, so as to insure uniform superior quality and interchangeability throughout.

This interest in the maintenance problems of operating companies has led to the development of improved parts for older forms of motors and control, embodying some of those saving features now incorporated in more modern designs, such as brush holders, and through bolt housings for split motors, and the arranging of improvements in HL control so as to fit existing equipments.

Westinghouse automatic substation control equipment consists of an assembly of commercially proven apparatus which duplicates in every way manual operation automatically, thus providing the railway industry with one of the most important economical devices of modern times in connection with power supply. The savings and usefulness of automatic control in railway substations have influenced many prominent electric railway companies, such as the Cleveland Railways, The Milwaukee Elec. Ry. & Lt. and the York Railways, to adopt them.

The many years' experience of the Westinghouse Company in the manufacture of line material has led to the development of a full line of standard parts covering every requirement embodied in modern overhead construction for electric railways. Molded insulation, rust-proofing processes, and alloys used in the construction of Westinghouse line materials are of the highest grades, selected after years of research and service tests, thus insuring reliability and long life.



No. 801 Magnetic line switch for auxiliary contactors.

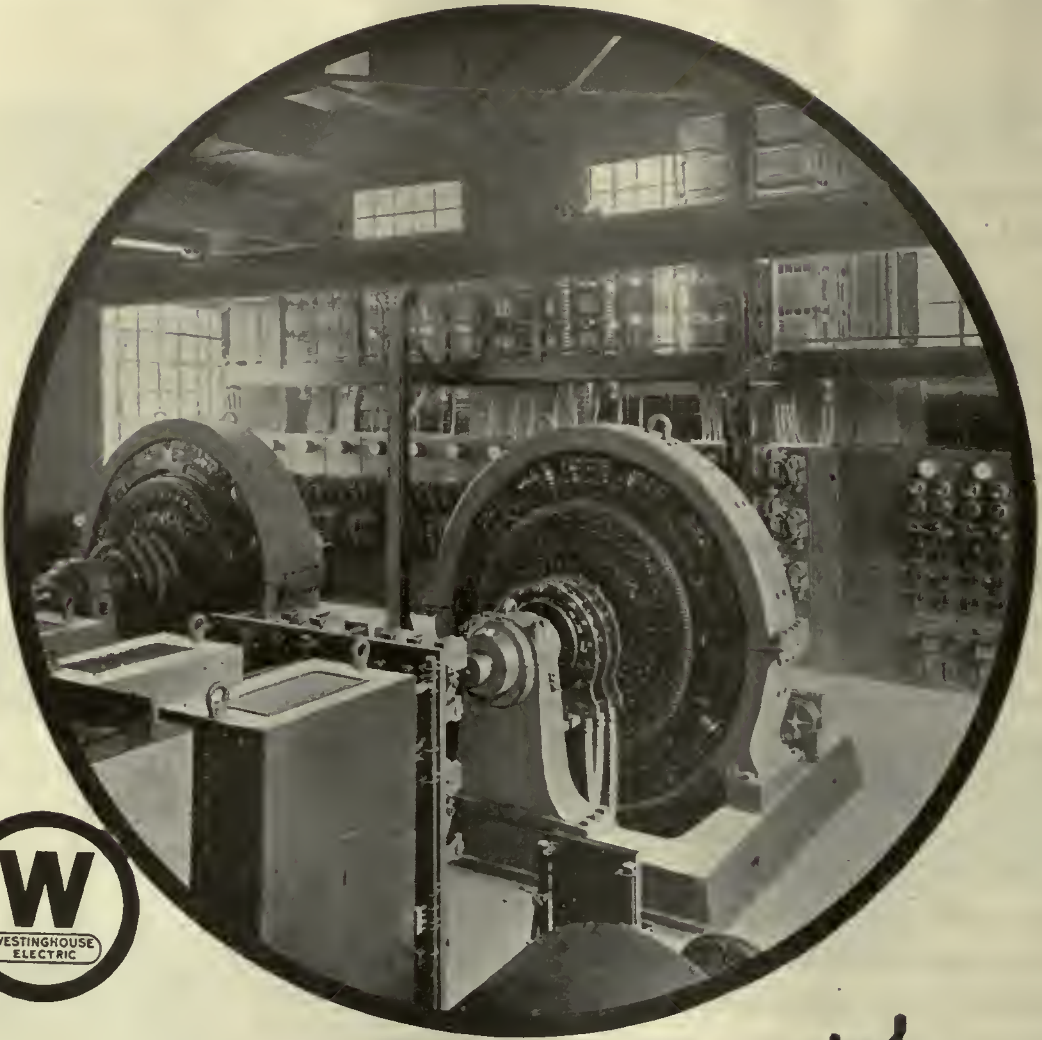
No. 806 pneumatic line switch for auxiliary contactors

Through-bolt housings for split-frame motors.

Westinghouse automatic switching equipment of the Milwaukee Electric Ry. & Light Company

Westinghouse Electric & Manufacturing Company

East Pittsburgh, Pa.



WESTINGHOUSE ELECTRIC

Automatic Substations Help Railways to Sell Better Transportation

The large savings on many railways by the use of the Westinghouse automatic substation have made other improvements and replacements possible.

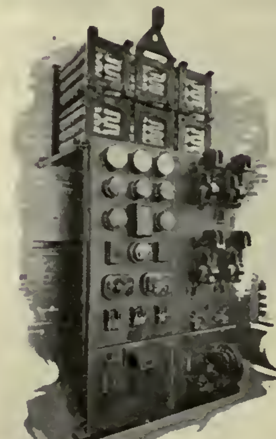
The reduction in cost of substation operating labor alone has been enormous. The benefit is immediately felt in every field of application of this equipment.

The reduction of power loss due to the elimination of idle running time makes possible a further saving of considerable amount.

Because of a larger number of substations in an automatic system, much feeder copper is saved with greatly reduced line losses. The salvaged feeder copper often is enough to pay a large fraction of the investment cost of the new equipment. Electrolysis conditions also are minimized. Building costs are less because conveniences necessary for a hand operated station are omitted.

The total amount that can be saved for the electric railways by automatizing the several thousands of substations is incalculable. A fraction of the total amount if expended for better merchandising of transportation would work wonders.

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY
East Pittsburgh, Pa.



Some of the recent Westinghouse automatic substations are listed here:

Kansas City Railway Co.
Iowa Railway & Light Co.
Conestoga Traction Co.
Cleveland Railway Co.
Pacific Electric Railway
Grand Rapids, Grand Haven and Muskegon Ry.
Ft. Wayne & Decatur Traction Co.
Joplin & Pittsburgh Rys.
Missouri & Kansas Interurban
Pacific Northwest Traction Co.
Milwaukee Elec. Ry. & Lt. Co.
United Rys. Co. of St. Louis
Petaluma & Santa Rosa Ry. Co.
Northern Texas Traction Co.
York Rwys. Co.

Westinghouse

The SAFETY CAR

Sells Transportation—
Keeps the Public *Sold*

AMONG developments of recent years, the Safety Car stands foremost as a concrete example of successful salesmanship in transportation.

Since 1916, under the most varying conditions, in large and small communities, the Safety Car has built traffic and increased revenue by recapturing old patrons and creating new ones.

Giving better response both in acceleration and deceleration, running with greater frequency, affording maximum comfort, the great outstanding appeal to the car-riding public is *Better Service.*

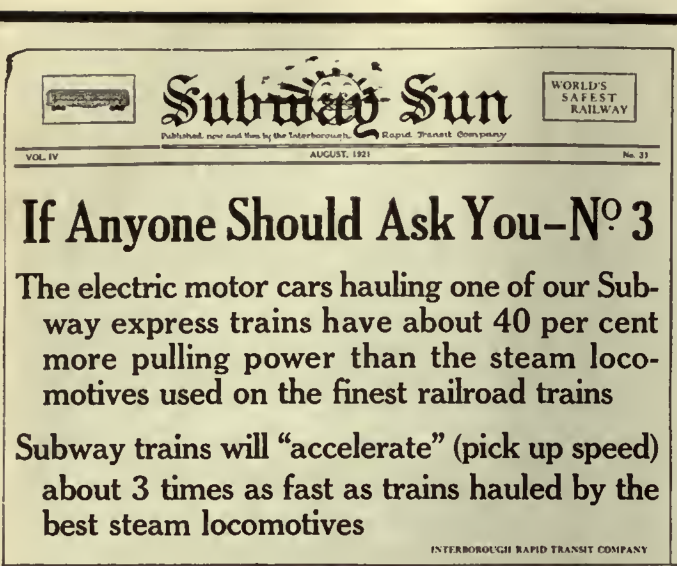
This is a fact that is substantiated by the records of 340 Companies which have applied the principles of modern salesmanship to transportation by means of the Safety Car.

The increased service made possible by the Safety Car not only results in more traffic and more revenue, *but actually costs less!*

"Sell It the Safety Car Way"

SAFETY CAR DEVICES CO.
OF ST. LOUIS, MO.
Postal and Telegraphic Address:
WILMERDING, PA.
CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH

It is not a Safety Car unless equipped with our standard Air Brake and Safety Car Control Devices.



Subway Sun

Published now and then by the Interborough Rapid Transit Company

WORLD'S SAFEST RAILWAY

VOL. IV AUGUST, 1921 No. 31

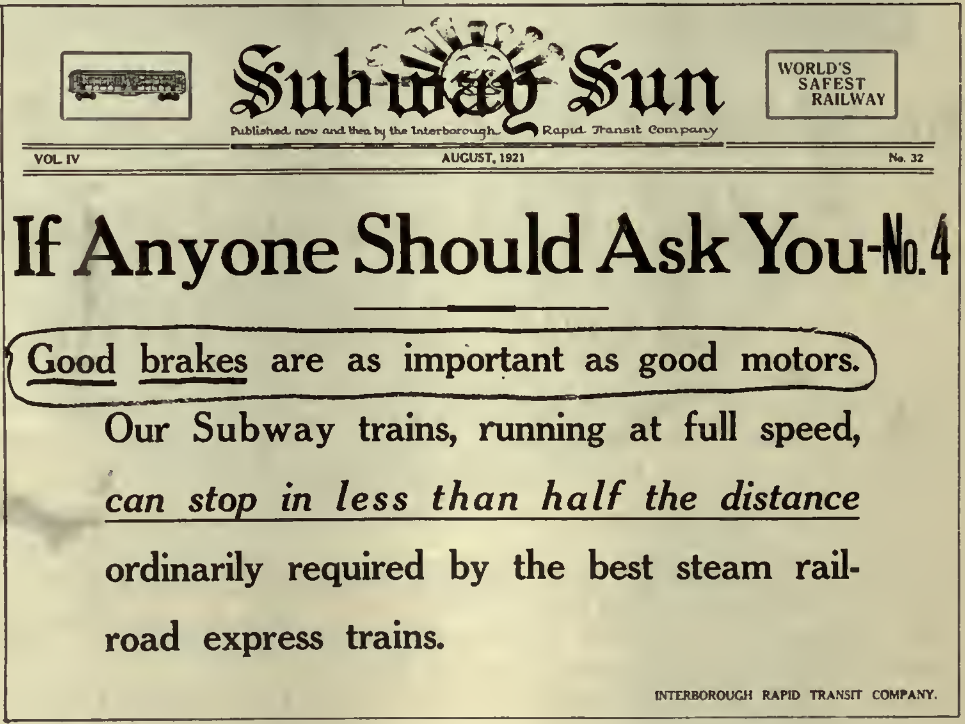
If Anyone Should Ask You—Nº 3

The electric motor cars hauling one of our Subway express trains have about 40 per cent more pulling power than the steam locomotives used on the finest railroad trains

Subway trains will "accelerate" (pick up speed) about 3 times as fast as trains hauled by the best steam locomotives

INTERBOROUGH RAPID TRANSIT COMPANY

SECONDS WORTH MILLIONS



Subway Sun

Published now and then by the Interborough Rapid Transit Company

WORLD'S SAFEST RAILWAY

VOL. IV AUGUST, 1921 No. 32

If Anyone Should Ask You—No. 4

Good brakes are as important as good motors.

Our Subway trains, running at full speed, *can stop in less than half the distance* ordinarily required by the best steam railroad express trains.

INTERBOROUGH RAPID TRANSIT COMPANY.

Two of a series of car bulletins recently displayed in the New York Subways by the Interborough Rapid Transit Company.

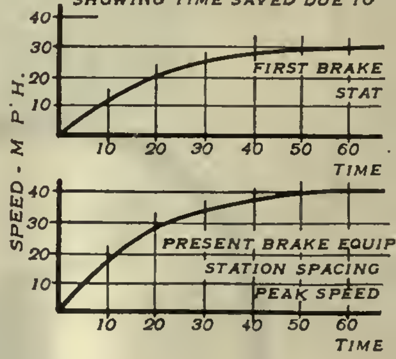
THE Interborough Rapid Transit Company has never underestimated the value of "good brakes."

"Good brakes" enabled the Interborough to develop limited track facilities to a point where it could safely operate sufficient trains to accommodate the dense traffic originating in a city of seven million.

The capacity of the system when opened for operation in 1904 was 350,000 passengers a day. By taking advantage of opportunities to increase the efficiency of its brakes, the original subway today carries about 1,250,000 each 24-hour period. This remarkable gain is due, among other things, to increased speed, larger trains and greatly shortened headway, made possible by better brakes.

Time is the most precious element involved in the operation of New York's subways. It has been said that seconds are worth millions. The history of the Interborough proves that time saving is a matter of braking facilities. The accompanying chart affords an interesting comparison of time consumption in train movement between stations yesterday and today. Note the sharp deceleration curve under present conditions. A saving of 20 seconds to each minute has been accomplished by "good brakes" in the last 15 years.

COMPARATIVE RUNNING TIME BE
SHOWING TIME SAVED DUE TO



WESTINGHOUSE TRACTION BRAKES

TIME ECONOMY—

The Problem of Deceleration as Related to Acceleration

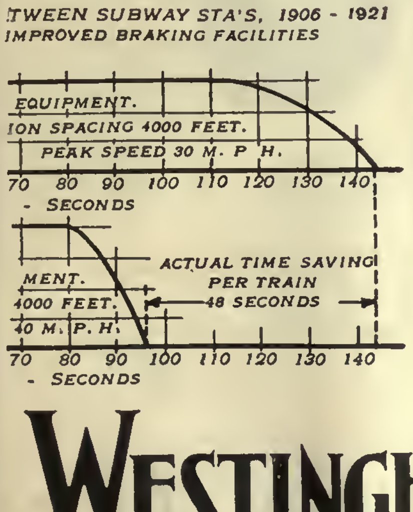
Brakes the Controlling Factor

GOOD motors, providing quick and powerful acceleration, are naturally responsible for much of the improvement shown during the last 15 years in Subway transportation, but the Interborough Rapid Transit Company realizes that the ability to move trains at all depends on the ability to control them, and this conviction is expressed in the statement that "Good brakes are as important as good motors."

Increasing the capacity of the motors alone is of no advantage beyond a certain point; there must also be a corresponding increase in braking force. Early in its career the Interborough established the fact that further development of its motive power would depend primarily on its ability to secure appropriate braking facilities. When these facilities were supplied by the Westinghouse Traction Brake Company, in the form of the Electro-Pneumatic brake equipment (together with the Westinghouse Governor Synchronizing System, Automatic Car and Air Couplers, and Compressors), it became possible to increase speeds, lengthen trains, extend car capacity, shorten block signal spacings (permitting greatly reduced headway), and operate 50 per cent more trains with the same track mileage.

The subsequent increase in traffic capacity from 350,000 to 1,250,000 is largely the result of the time saving effected in train movement by means of better braking facilities.

THERE is a Westinghouse brake especially adapted for every class of Electric Railway service, each type as efficient in its particular field as that used in high-speed Subway operations, and each designed in the interests of human safety, time economy and general traffic betterment.



Westinghouse Traction Brake Company

General Offices and Works: Wilmerding, Pa.

OFFICES:

Boston, Mass.
Chicago, Ill.
Columbus, O.
Denver, Colo.
Houston, Tex.
Los Angeles
Mexico City
St. Paul, Minn.
St. Louis, Mo.
New York
Pittsburgh
Washington
Seattle
San Francisco

WESTINGHOUSE TRACTION BRAKES

Nuttall

STANDARD HELICAL GEARS

Nuttall Helical Gears manufactured since 1914—in a constantly increasing volume—demonstrating superiority every day in every class of service, due to the 7½ deg. angle, long and short addendum type of tooth, workmanship and BP treatment.

All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for Nuttall Electric Railway and Mine Haulage Products.

Over 25,000 sets in service

R. D. NUTTALL CO. PITTSBURGH, PA.

Nuttall

TROLLEY PARTS

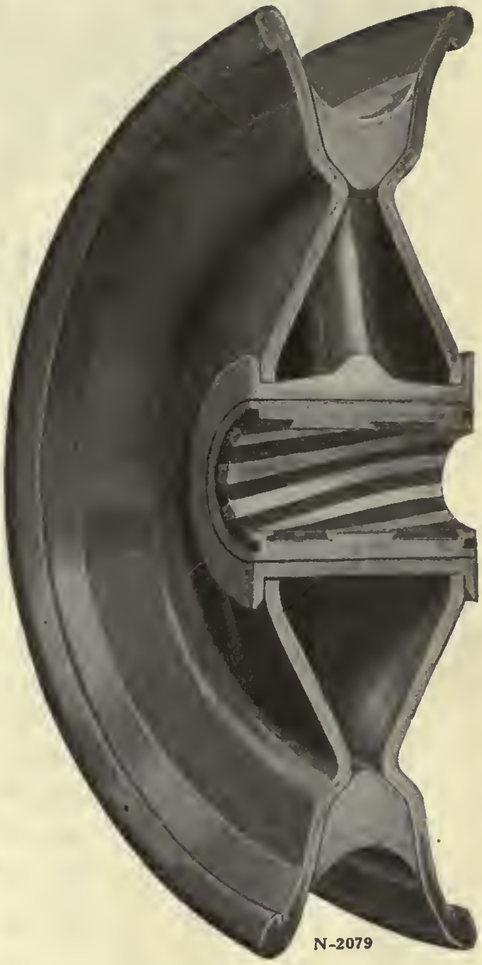
for lower maintenance cost

Don't forget that Nuttall stands for finest grade trolley equipment as well as for efficient, long-life helical gears. The same progressiveness in design and accuracy of construction that characterizes our helical gear is found in NUTTALL trolley parts. Smoothness and efficiency in operation are combined with that cost-reducing, longer life factor.

Our Ideal Trolley Wheel is a combination of steel and bronze—steel for strength and bronze where its current-collecting capacity makes for highest efficiency. The Ideal wheel is bushed with a self-lubricating graphite bearing, is finished true to form and accurately balanced.

Nuttall Trolley Harps are made of highest grade malleable iron, whose toughness insures ability to withstand the bumping and hammering against overhead construction.

Reduce maintenance costs and secure more satisfactory service with all Nuttall Trolley Parts.



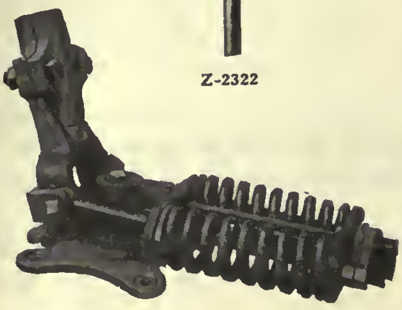
N-2079

Write Right Now—

for complete information and set of bulletins on helical gearing and Nuttall trolley parts.

R.D.NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

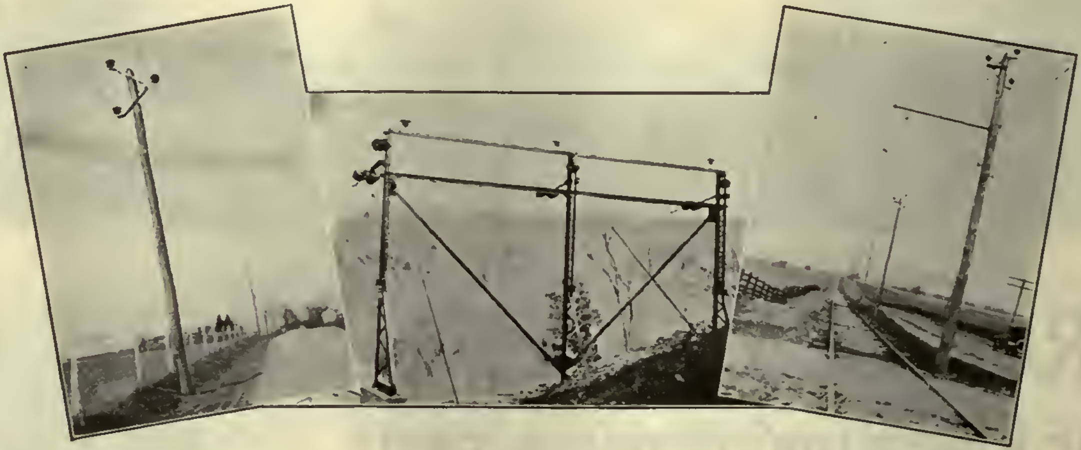
Z-2322



NUTTALL Form 15-C Trolley Base

Z-2325

Z-2329



Where To Obtain the Economies Simpler Methods Bring

One of the largest manufacturers in this country recently bought a railroad to simplify *his* methods of getting materials to his factories. He valued the time and money it would save at millions of dollars a month.

You can save time and money when getting pole line materials by using more simple methods. Use the facilities of the Western Electric House near you. Its nearness and large stocks of everything electrical save time and expedite deliveries.

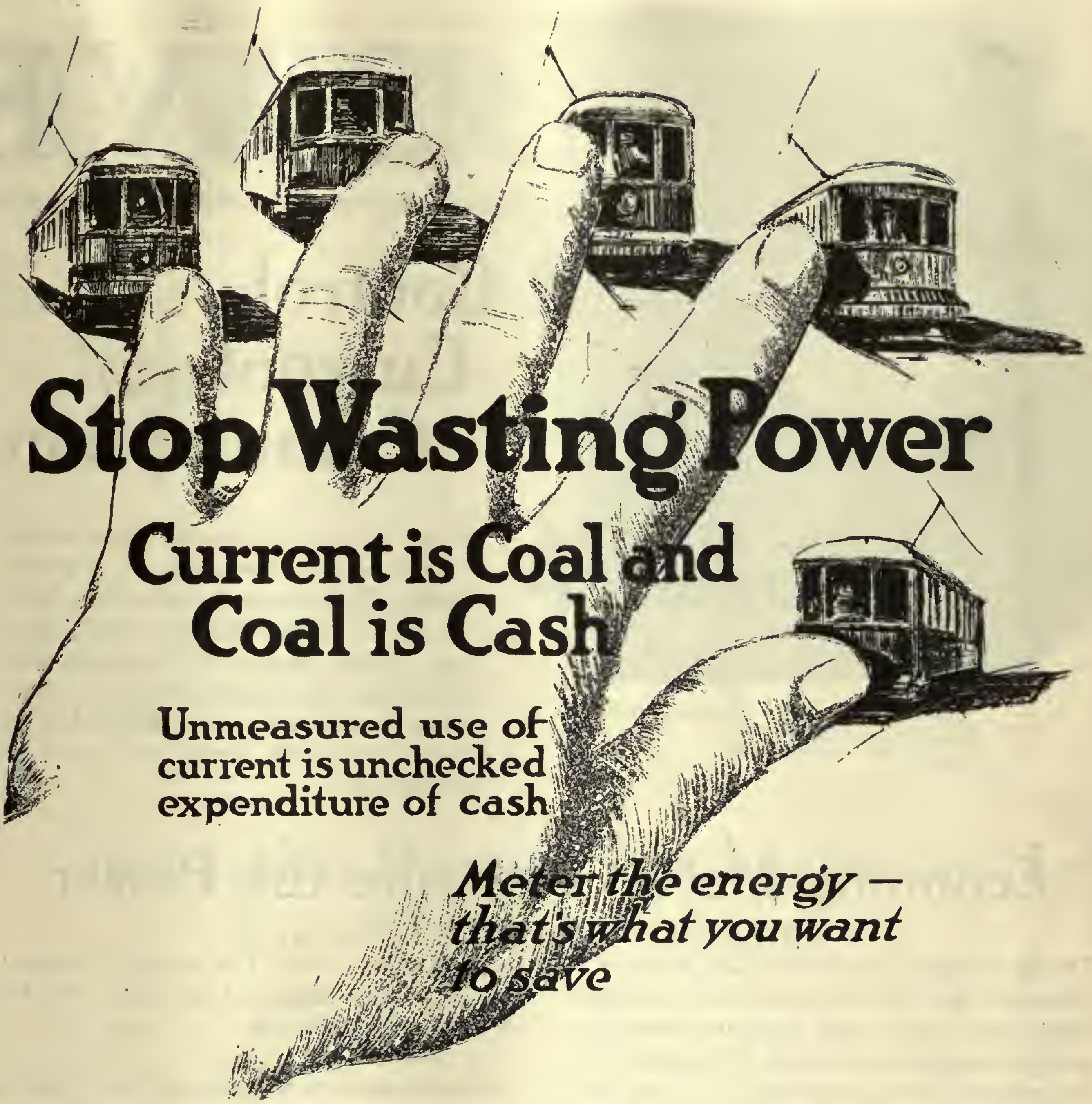
It will help you in *your* task of maintaining your standards of service.

Get in touch with our nearest House

*A
NATIONAL
ELECTRICAL
SERVICE*

Western Electric Company

OFFICES IN ALL PRINCIPAL CITIES



Stop Wasting Power

Current is Coal and Coal is Cash

Unmeasured use of current is unchecked expenditure of cash

Meter the energy — that's what you want to save

You very properly throw every conceivable safeguard about your receipts. You check and control at every step from passenger to bank. Expenditures are similarly controlled. Vouchers are checked before payment. Likewise at the power plant, the consumption of coal, water, oil and even cotton waste is measured and recorded. Every kilowatt of energy sold or purchased is metered.

And then what happens on the car?

A practically unlimited supply of energy is made available for any motorman to draw upon at will—unchecked, uncontrolled and unrecorded. Is not this also a place to induce substantial economies by measuring the power used by each motorman?

Your power item is 10 to 15 per cent. of your total operating cost. Stop wasting power. Read on and see how easy it is to have every motorman help conserve a large part of the power now wasted.

See following pages.

SAVE

0288
KILOWATT HOURS
KWH
ECONOMY ELECTRIC RAILWAY METER
SANGAMO ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS.
NO. 720538 VOLTS 550 AMPS. 200
66 2/3 WATTHOURS PER DISK REVOLUTION
MFD. EXCLUSIVELY FOR
ECONOMY ELECTRIC DEVICES CO.
CHICAGO

Economy Meter with Power-Saving Dial

Control Current Consumption

Few, if any, motormen waste power deliberately—the majority use it prodigally. They do so because they have no means of knowing how much they use. What else could be expected? Motormen are blindfolded as to their power consumption unless aided by a device that tells them how much is consumed.

Economy Meters Measure the Power

The Economy Power-Saving Car Meter is a direct-reading kilowatt hour meter, rugged, substantial, easily read and understood by any motorman. It records the actual car-propulsion power used—no indirect factors to consider.

The operator knows how much energy he is using on any trip or on any part of a trip. He can read his results under different methods of accelerating, coasting and braking. His own results can be compared with those of other men. The spirit of friendly competition is stimulated and individual instruction is facilitated.

In actual practice, the savings have repaid the entire cost of complete Economy Meter installations in six months.

Economy Power-Saving Meters have other advantages. The inspection dial feature, described on the next page, is equally valuable.

Meter the energy—

That's what you want to save

POWER

7 0 2 3
KILOWATT HOURS
C
B
A
ECONOMY ELECTRIC RAILWAY METER
SANGAMO ELECTRIC COMPANY
SPRINGFIELD ILLINOIS
No 1036948 VOLTS 550 AMPS 100
3 3 1/3 WATTHOURS PER DISK REVOLUTION
MFD. EXCLUSIVELY FOR
ECONOMY ELECTRIC DEVICES CO.
CHICAGO

Economy Meter—With Power-Saving and Car Inspection Dials

Indicate Inspection Intervals

Most parts of a car require inspection at intervals proportionate to work done. Neither mileage run, nor any time factor correctly measures the work done by a car.

Inspection Periods Automatically Announced By Meters

The Economy Power-Saving and Car-Inspection Meter accurately and automatically shows when car inspection is due. It also shows at a glance how much more work a car can do before inspection is needed or, in case of a road failure, how much work the car has done.

The result achieved is more thorough inspection without increased labor cost, or the previous standard of inspection for less labor cost. It guards against too many inspections on some cars and too few on others.

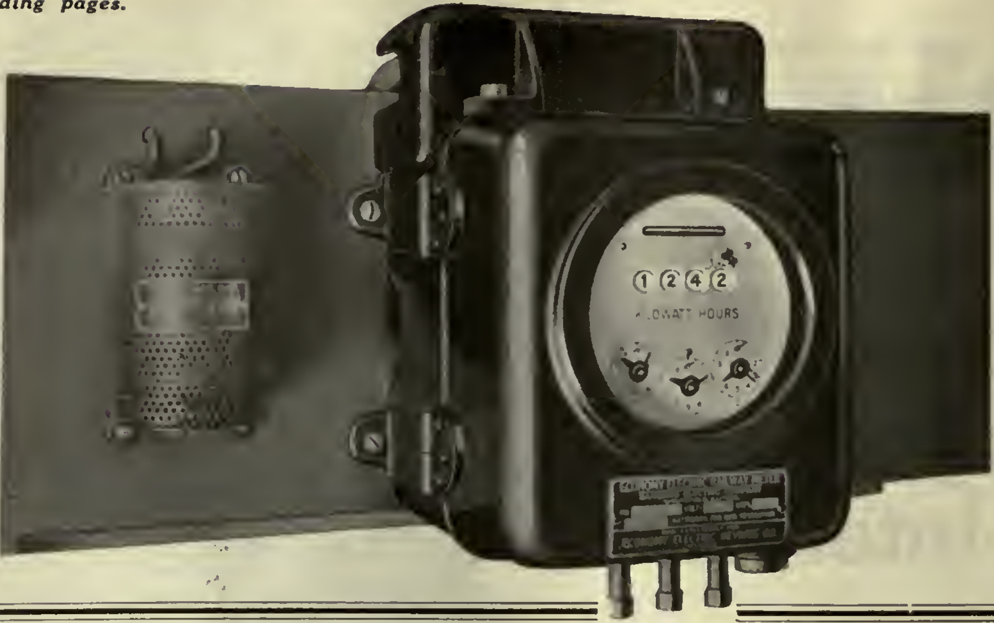
The car-inspection meter is unchanged from standard except for the front case and dial, which are applicable to old meters.

The saving resulting from inspection on the kilowatt hour basis has been found, by several companies, sufficient in itself to make profitable the purchase of meters. The evidence is plain. The following page presents it.

Save power at the car
and labor at the car house

See following page

See preceding pages.



Economy Meters are in successful power-saving service on more than seventy-five roads having equipment ranging from 4000 H.P. electric locomotives to 50 H.P. Birney Safety Cars

A Few of the Economy Metered Roads:

Allegheny Valley
Atlantic City & Shore
Buffalo & Lake Erie
Butler Street Railway
Cedar Rapids & Marion City
Chicago & Joliet
Chicago, Milwaukee & St. Paul
Chicago, No. Shore & Milwaukee
Chicago & West Towns
Cincinnati Lawrenceburg & Aurora
Cincinnati Traction Co.
City Electric, Albuquerque
Claremont Railway
Clinton, Davenport & Muscatine
Columbus, Marion & Bucyrus
Dayton, Springfield & Xenia
Denver Tramway Co.
Douglas Traction & Light
Dubuque Electric Co.
East St. Louis
Eastern Massachusetts
Eastern Texas Elec. Co.
El Paso Electric Ry.
Empire State Ry.
Evansville & Ohio Valley
Ft. Madison St. Ry.
Ft. Wayne, Van Wert & Lima
Galesburg & Kewanee.
Indiana Service Corp.
Kankakee Electric Ry.
Keokuk Electric Co.
Kokomo, Marion & Western
London & Port Stanley
Milwaukee Elec. Ry. & Lt.
New York, New Haven and Hartford
Omaha, Lincoln & Beatrice
Pennsylvania-Ohio Elec. Co.
Philadelphia Rapid Transit
Quincy Railway Co.
Rochester & Syracuse
Rockford & Interurban
Sacramento-Northern
San Diego Electric Ry.
Scranton Railway
Seattle Municipal Ry.
Seattle & Ranier Valley
Sheridan Railway
So. Covington & Cincinnati
Southern Pennsylvania
Stark-Electric Co.
Texas Electric Ry.
Tri-City Ry. & Lt. Co.
Union St. Ry., New Bedford
Union Traction of Ind.
Washington-Virginia Ry.
Wichita Ry. & Lt. Co.

ECONOMY Power-Saving Meters tell you—

1. WHO are your careful, economical motormen.
2. WHICH motormen need instruction in proper handling of car equipment.
3. HOW much power is being saved by motormen collectively and individually, by direct reading units of power.
4. HOW much power is being used on any section of your lines.
5. HOW much power is being used in trailer service.
6. HOW much power your freight and express service is using.
7. HOW much power is being used for switching and car movements in yards.
8. WHAT is the line loss on your D.C. distribution.
9. WHEN your schedule speeds are too high or too low.
10. WHAT is the most economical equipment for any service.
11. WHAT are the proper gear ratios for given service conditions.
12. WHEN each car should be inspected.

Meter the energy—That's what you want to save

Economy Electric Devices Company

L. E. GOULD, Pres., Old Colony Bldg., Chicago
Cable Address: Sangamo, Chicago

National Railway Appliance Co., New York
L. A. Nott, San Francisco

Alfred Collyer & Co., Montreal, Quebec
Burton R. Stare Co., Seattle
J. G. Monahan, Los Angeles

Ludwig Hommel & Co., Pittsburgh
Grayson Railway Supply Co., St. Louis

Modernize! *Pneumatize!*

"Figure yourself", as the Frenchman says, the natural deductions from the following situation:

The electric railway prospect of today has his house cleaned with a motor-operated vacuum cleaner; his clothes washed and laundered by electrical machinery; his phonograph wound up by a motor; his bread toasted by electricity almost instantaneously while his coffee may have come out of a motor-driven grinder. Then his wife whisks him to the station in an automobile fitted with a self-starter.

Just what will be his impression, then, if the cars of the *electric* street railway in town are run on the same hand-pull and hand-signal basis as in the days when there were no such labor-saving appliances as those named?

To put "1921" pep into "1900" cars, confer with us on the application of

National Pneumatic

Door and Step Control
Door and Step Operating Mechanisms
Motorman's Signal Lights
Safety Interlocking Door Control
Multiple Unit Door Control

Manufactured in Canada by
Dominion Wheel & Foundries, Ltd.
Toronto, Ont.

National Pneumatic Company, Inc.
50 Church St., New York
Edison Bldg., Chicago
Works: Rahway, N. J.

DAYTON

Resiliency Neutralizes the sledge-hammer blows that destroy track and rolling-stock

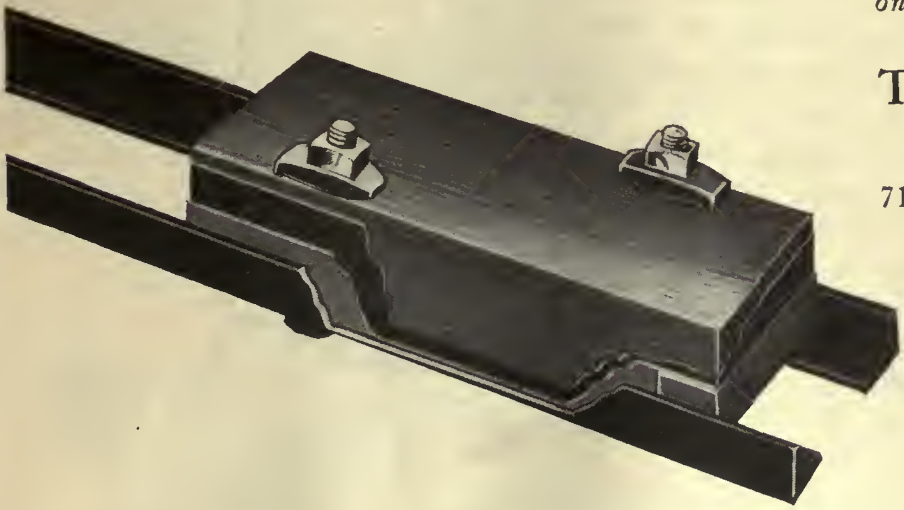
At every rail joint—at every track depression—at every weak spot along the right-of-way there is a giant sledge-hammer delivering a two-ton blow at track and rolling stock each time a street car passes.

Not a pretty picture, is it?—and not a happy thought when you *know* that these nerve racking, property destroying blows that are pounding the life out of your equipment day after day *can be eliminated.*

That the shock absorbing features of Dayton Resilient Ties do neutralize these sledge-hammer blows, has been and is being demonstrated daily on hundreds of track-laying jobs throughout the country.

And in addition to the all-important saving in repairs on track and pavement—in addition to insuring longer life of rolling stock—*first cost* of Dayton Resilient Ties is $6000 per mile *less* than track laid on wood ties on concrete foundation and $2000 per mile *less* than track laid on wood ties on gravel ballast.

Write for complete information
on Dayton Resilient Ties.



The Dayton Mechanical Tie Company

710 Commercial Bldg., Dayton, Ohio

Resilient
TIE

PIN TO LETTER

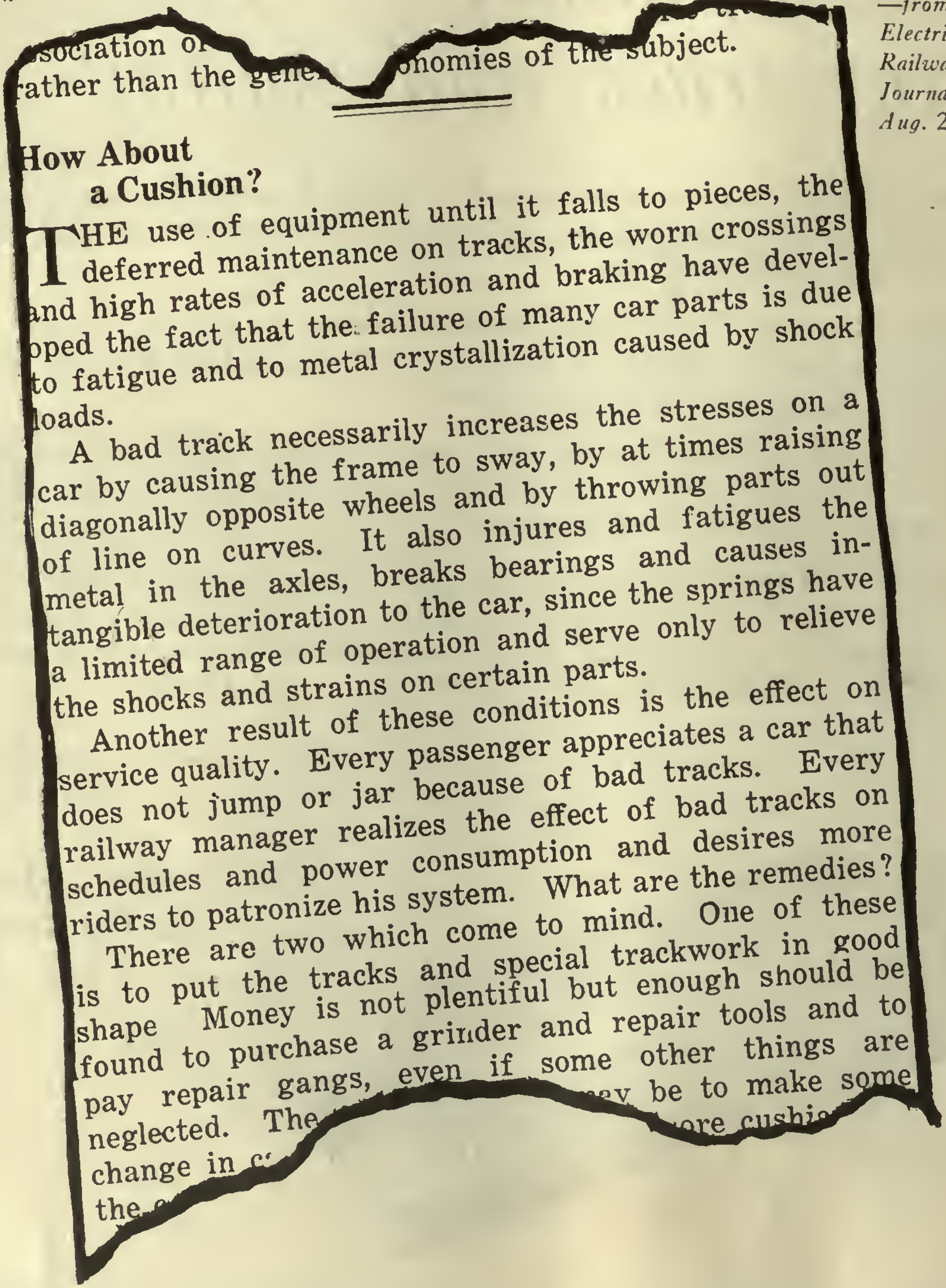
Dayton Mechanical Tie Company
710 Commercial Bldg.,
Dayton, Ohio

Without obligation, please send me full information about your Dayton Resilient Ties.

Rough Track Is Not Only

A Moment with the Editor

—from the Electric Railway Journal Aug. 27, 1921.



sociation o

ather than the gene nomies of the subject.

How About a Cushion?

THE use of equipment until it falls to pieces, the deferred maintenance on tracks, the worn crossings and high rates of acceleration and braking have developed the fact that the failure of many car parts is due to fatigue and to metal crystallization caused by shock loads.

A bad track necessarily increases the stresses on a car by causing the frame to sway, by at times raising diagonally opposite wheels and by throwing parts out of line on curves. It also injures and fatigues the metal in the axles, breaks bearings and causes intangible deterioration to the car, since the springs have a limited range of operation and serve only to relieve the shocks and strains on certain parts.

Another result of these conditions is the effect on service quality. Every passenger appreciates a car that does not jump or jar because of bad tracks. Every railway manager realizes the effect of bad tracks on schedules and power consumption and desires more riders to patronize his system. What are the remedies?

There are two which come to mind. One of these is to put the tracks and special trackwork in good shape Money is not plentiful but enough should be found to purchase a grinder and repair tools and to pay repair gangs, even if some other things are neglected. The ay be to make some change in c ore cushi

the

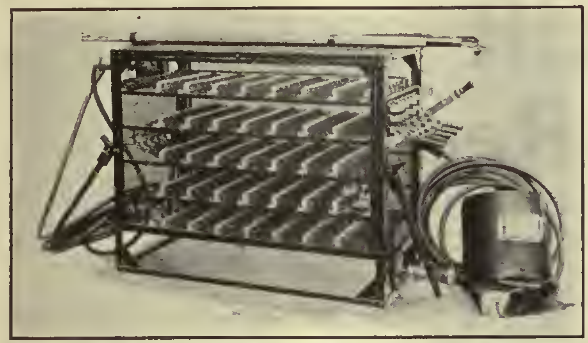
RAILWAY TRACK-

3132-48 East Thompson St.,

Costly — It Is Unnecessary

The Remedies Are Here!

These equipments have been chosen by 439 Companies in every State and every country of the civilized World to secure smooth-running track and reduce maintenance costs.

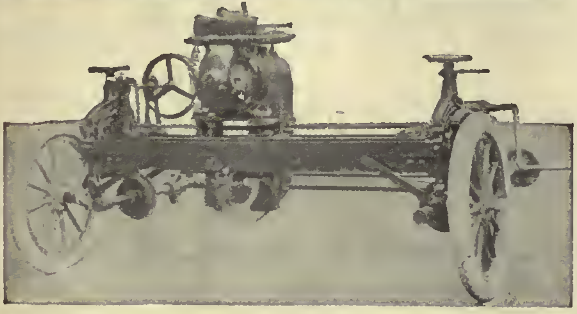


"AJAX"
Electric Arc Welder

The most modern welder on the market, designed for the reclamation of rails and special work at lowest cost. Light, rugged and simple, it is especially adapted for the usual track crew organization.

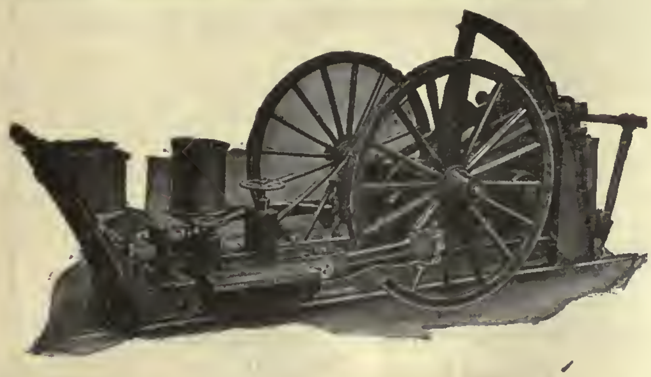
"ATLAS"
Rail Grinder

A low cost economical rotary grinder for removing surplus metal after building up joints or special work with "AJAX" welder. Extremely simple to operate and maintain.



"UNIVERSAL"
Rotary Track Grinder

An improved rotary grinder with valuable features such as a tilting grinding wheel, large rubber tired derail wheels, and three point suspension of grinding wheel arbor bearing for maximum stability.



"RECIPROCATING"
Track Grinder

For absolutely removing all traces of corrugation, and for smoothing out joints at the first signs of "Cupping," there is no apparatus or method which can supplant the RECIPROCATING GRINDER. One or more of these machines should be in constant service on every road to insure smooth track at all times.

WORK COMPANY

Philadelphia, Pa.

After Investigation of all Types of Power-Saving Devices

ARTHUR
Power-Saving Recorders

were ordered by the following important street railways—and many others:

WASHINGTON, D. C.:	Washington Railway & Electric Co.
BALTIMORE, MD.:	The United Railways & Electric Co.
NEW JERSEY:	The Public Service Railway Co.
BROOKLYN, N. Y.:	Brooklyn Rapid Transit Co.
CONNECTICUT:	The Connecticut Co.
SPRINGFIELD, MASS.:	The Springfield St. Ry. Co.
WORCESTER, MASS.:	The Worcester Consolidated St. Ry. Co.
PROVIDENCE, R. I.:	The Rhode Island Co.
OTTAWA, CANADA:	Ottawa Electric Railway Co.
LONDON, ENGLAND:	Metropolitan Electric Tramways, Ltd.
LONDON, ENGLAND:	The London United Tramways, Ltd.
LONDON, ENGLAND:	The South Metropolitan Electric Tramways & Lighting Co., Ltd.

It speaks the language of the motorman.

More than 10,000 Arthur Recorders are in successful use

The Demonstrated Facts About the Recorder Are:

(1) The clerical expense in following up the records is a minimum.
(2) The saving is a maximum.
(3) The motormen understand it at once.
(4) It gives valuable data to the inspection and engineering departments in the simplest and most effective way.
(5) It is reliable and sturdy.
(6) It costs least to purchase, install and maintain.

"Arthur Recorders are fully protected by strong basic patents"

For further information write to

THE ARTHUR POWER-SAVING RECORDER CO.
Second National Bank Building, New Haven, Conn.

1922

"*Why* I should attend the 1921 Convention"

Because every major problem of my company which I must solve during the coming year will be discussed by scores of speakers and assembled delegates.

Even if only fifty men of ten year's experience each discuss these problems, they will represent a total of 500 years of study, which would be more experience than I could crowd into several lifetimes.

I'm going to the convention as an *educational investment.*

Even two's a crowd if both want transfers

Ask Springfield

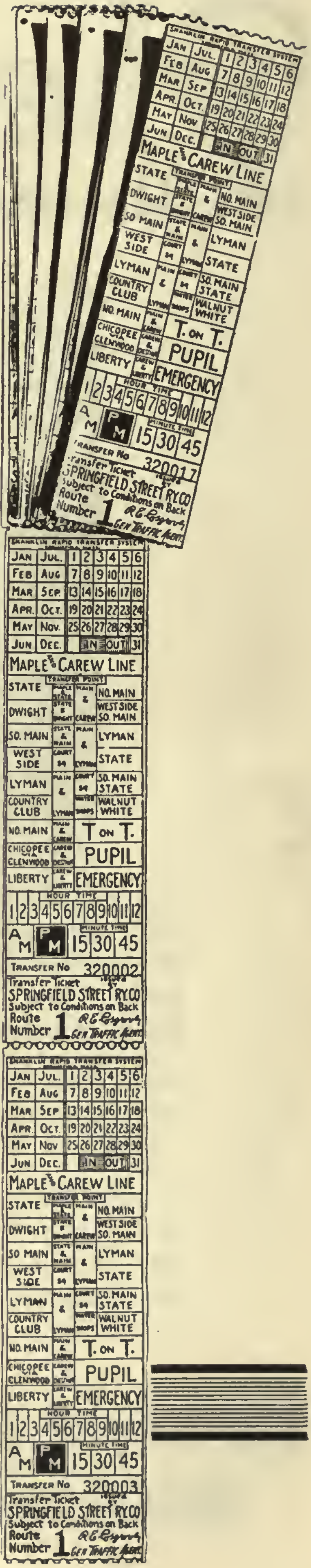
Ask Terre Haute

One-man cars and double end cars in Springfield, Mass., are equipped with Shanklin Transfer Machines

SHANKLIN

Transfer Machines

Handle Crowds with Ease and Dispatch



The door can't be closed and the car started until the crowd about the platform moves up.

And those who are waiting for transfers won't move up front till they get their transfers.

The conductor is having troubles of his own making change. When that little job is over he'll dole out the transfers. Probably he has enough punched ahead; probably not.

Every car man knows the confusion, exasperation and delay. So do you—particularly the delay.

There's a solution. Springfield, Mass., and Terre Haute, Ind., have tried it out on both one-man cars and double end cars. And it's proved practical in two ways.

The solution is the Shanklin Transfer Machine, which makes all the necessary punches, tears off the transfer and delivers it to the passenger—all with a minimum of effort and attention on the part of the operator or conductor. The pressing of one button adjusts the mechanism and a tap on a foot lever does the rest. It handles crowds like an adding machine handles figures.

It has effected a saving of 40% over hand issued transfers. There are no wasted transfers as none are punched until issued. Besides this saving on paper there is reduced expense on handling and checking.

It has certainly made good in Springfield and Terre Haute—just as the Shanklin Zone Issuing Machine has made good on the Beaver Valley Railway at New Brighton, Pa.

Shanklin Equipment Co.
Besse System Bldg., Springfield, Mass.

Shanklin Transfer Machines are used on these cars in Terre Haute

Phono-Electric

Recommended for trackless trolley

Side Swing of the Trolley

The side swing of the double trolley, as the trackless trollibus runs from one side of the street to the other, need not worry the maintenance department when Phono-Electric trolley wire is used. There will be no lines pulled down on tops of cars, for Phono-Electric is the tough, strong wire of wear.

It has been found in service to give from two to four times the wear of the best hard-drawn copper wire. This is equivalent to saying it will last that much longer.

Its known record under the hardest conditions of service—heavy current draughts—high speed—constant starting and stopping of cars—resistance to wear—Phono-Electric's reputation under such conditions is advance proof of its advantages for trackless trolley service.

Bridgeport Brass Company

Bridgeport Connecticut

Phono-Electric

lines and every other severe service

In Old Richmond

In old Richmond, Virginia, where the first practical service test of the trackless trollibus is now under way, they have been using Phono-Electric Wire on heavy traffic lines for several years.

It is safe to say that as trackless systems are extended the Virginia Railway Company will profit by their own experience and use Phono-Electric overhead as a guarantee of freedom from trolley troubles.

Bridgeport Brass Company
Bridgeport Connecticut

Insurance plus Marsh & McLennan Service

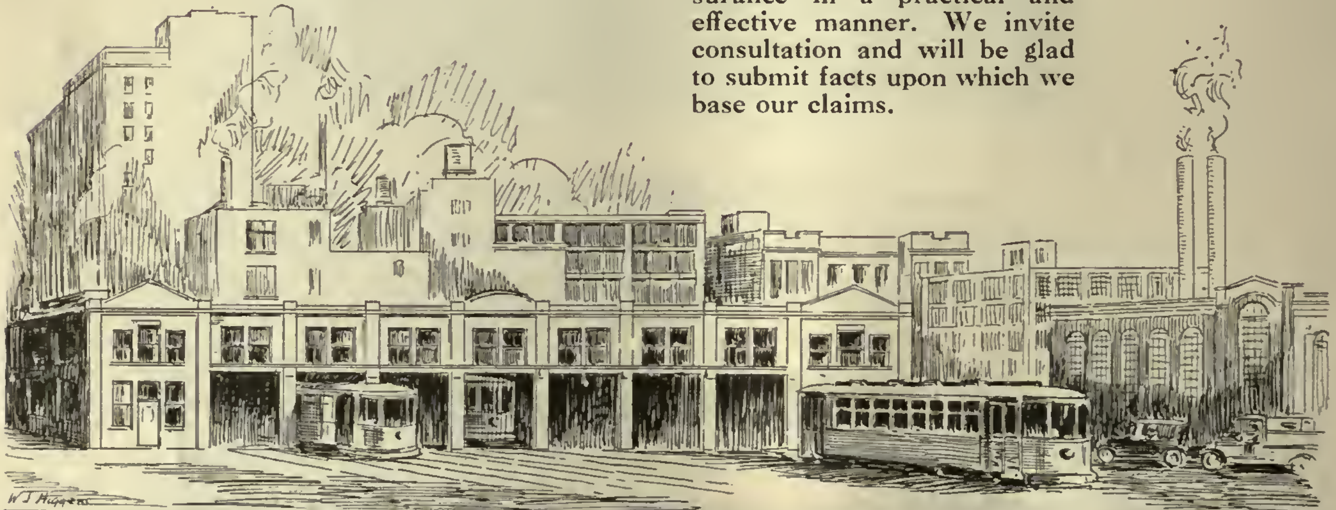
- Accident
- Employes' Group
- Automobile
- Bonds
- Burglary, Theft and Larceny
- Check Forgery
- Employes' Compensation
- Employers' Liability
- Engine Breakage
- Explosion
- Fire
- Fly Wheel
- Holdup
- Personal Injury Liability
- Plate Glass
- Registered Mail
- Sprinkler Leakage
- Steam Boiler—Explosion
- Strike, Riot—Civil Commotion
- Tornado and Windstorm

An understanding of Marsh and McLennan's conception of the word service will always be a determining factor among our clients.

For years we have rendered a highly specialized engineering service to the leading Public Utilities of America.

May we tell you more what insurance, plus Marsh and McLennan service, means to the business executive who would safeguard his profits, eliminate hazards and reduce his insurance cost?

Marsh and McLennan are qualified to handle your insurance in a practical and effective manner. We invite consultation and will be glad to submit facts upon which we base our claims.



MARSH & McLENNAN

175 W. Jackson Blvd. Chicago, Ill.

TRACK ROADWAY AND LINE MATERIAL

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- Anaconda Copper Mining Co.
- Anderson Mfg. Co., A. & J. M.
- Archbold-Brady Co.
- Armco Culvert & Flume Mfrs. Association

- Barbour-Stockwell Co.
- Bates Expanded Steel Truss Co.
- Buda Co., The

- Clark Elec. & Mfg. Co.
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- Duncan Lumber Co.
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- Massey Concrete Products Corp.
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- Ramapo Iron Works
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- Track Specialties Co.

- United States Electric Signal Co.

- Wharton, Jr. & Co., Wm.
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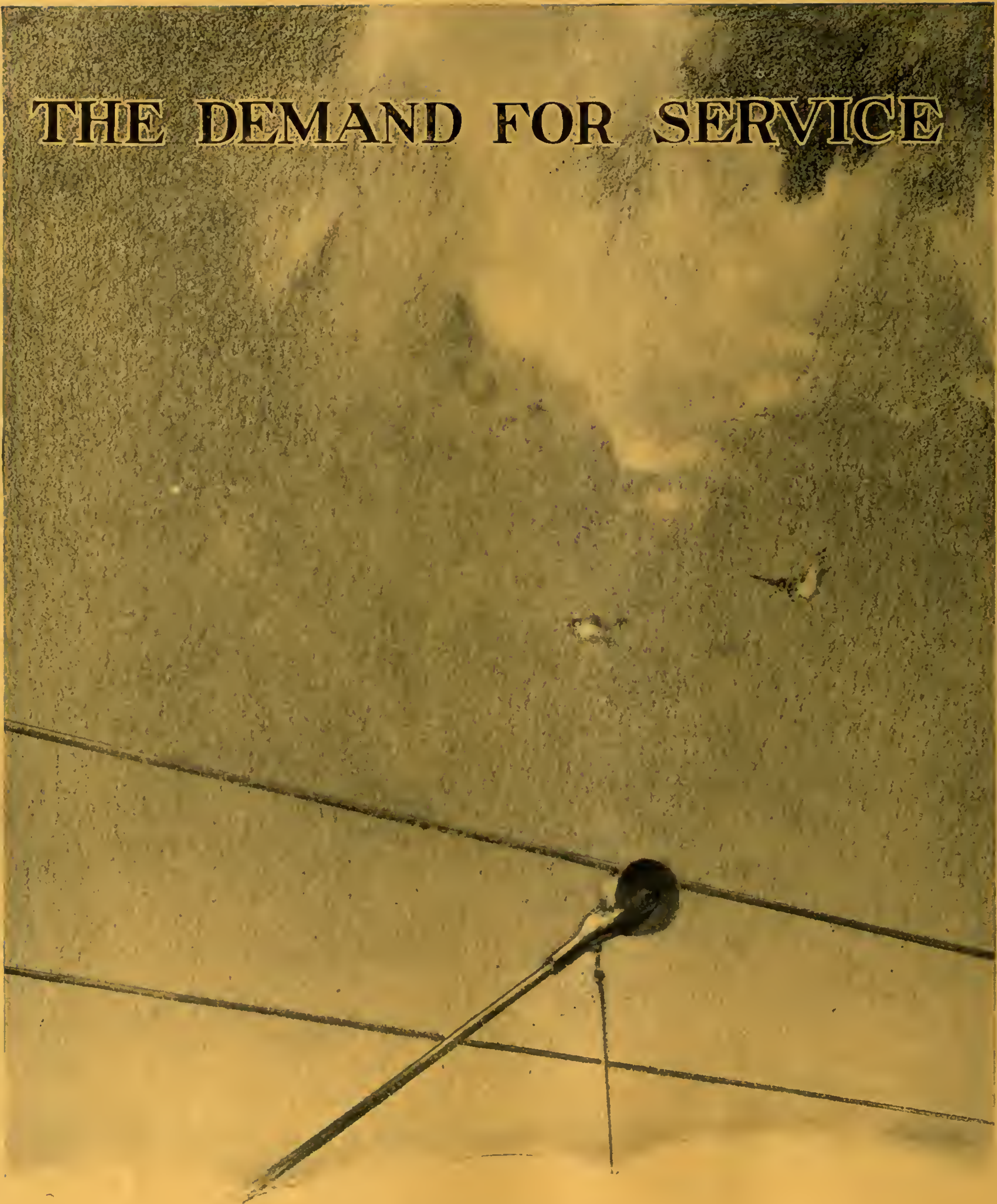
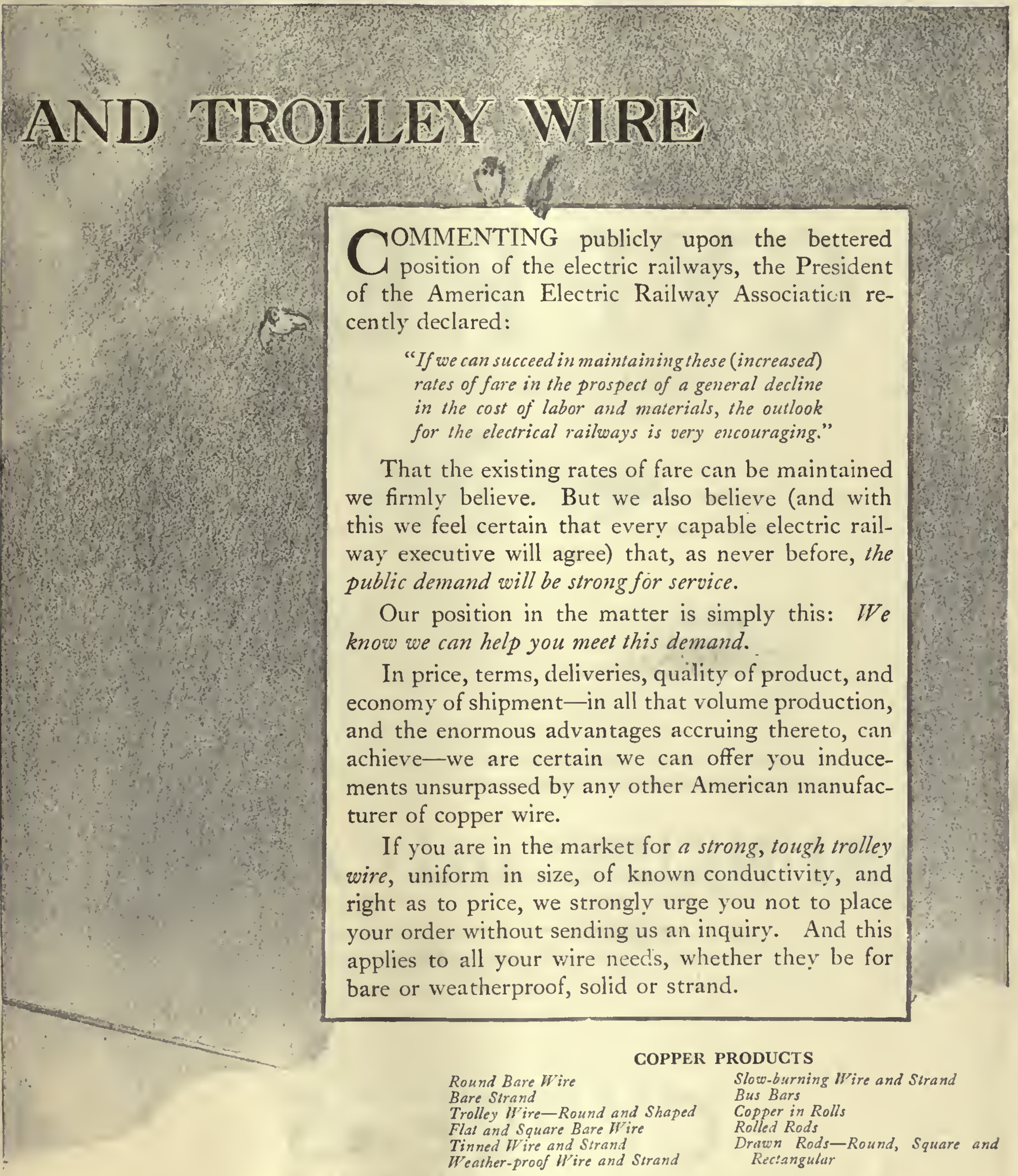


MILLS—BAYWAY, N. J.

AMERICAN COPPER PRODUCTS
CORPORATION
200 BROADWAY NEW YORK



COMMENTING publicly upon the bettered position of the electric railways, the President of the American Electric Railway Association recently declared:

> *"If we can succeed in maintaining these (increased) rates of fare in the prospect of a general decline in the cost of labor and materials, the outlook for the electrical railways is very encouraging."*

That the existing rates of fare can be maintained we firmly believe. But we also believe (and with this we feel certain that every capable electric railway executive will agree) that, as never before, *the public demand will be strong for service.*

Our position in the matter is simply this: *We know we can help you meet this demand.*

In price, terms, deliveries, quality of product, and economy of shipment—in all that volume production, and the enormous advantages accruing thereto, can achieve—we are certain we can offer you inducements unsurpassed by any other American manufacturer of copper wire.

If you are in the market for *a strong, tough trolley wire,* uniform in size, of known conductivity, and right as to price, we strongly urge you not to place your order without sending us an inquiry. And this applies to all your wire needs, whether they be for bare or weatherproof, solid or strand.

COPPER PRODUCTS

- *Round Bare Wire*
- *Bare Strand*
- *Trolley Wire—Round and Shaped*
- *Flat and Square Bare Wire*
- *Tinned Wire and Strand*
- *Weather-proof Wire and Strand*
- *Slow-burning Wire and Strand*
- *Bus Bars*
- *Copper in Rolls*
- *Rolled Rods*
- *Drawn Rods—Round, Square and Rectangular*

BRASS AND BRONZE PRODUCTS

- *Brass and Bronze Sheets*
- *Brass and Bronze Round Wire*
- *Brass and Bronze Flat and Square Wire*

MILLS—BAYWAY, N. J.

AMERICAN COPPER PRODUCTS CORPORATION

200 BROADWAY NEWYORK

Railway Engineers Who Have Studied the Qualities of Lumber

are a unit in agreement on the fact that

CYPRESS

"The Wood Eternal"

S C
No. of Mill
M A
TRADE MARK REG. U.S. PAT. OFFICE

(provided that you get Genuine "Tide-water" Cypress, guaranteed by the Association's Trade-mark)

is the best wood for all forms of use where high resistance to decay is an essential.

This fact is pretty clearly indicated by the recommendations of the Railway Signal Engineers Association for the use of cypress in

TRUNKING and CAPPING

It is equally valuable for *right-of-way fencing, snow fences,* and all similar forms of use where the material is constantly exposed to the action of the weather.

Make such forms of construction supremely durable by using

"TIDE WATER"
CYPRESS
"THE WOOD ETERNAL"

Full data regarding Cypress for all Railway uses will be furnished on request.

Southern Cypress Manufacturers' Association

1265 Poydras Building
New Orleans, La.

1265 Graham Building
Jacksonville, Fla.

There's Knowledge of Your Own Road Expressed in O-B Products

O-B Trolley Materials include frogs, crossovers, section insulators and strain plates—all with cam tips — ears, clamps, hangers, strain insulators and in fact all fittings for suspending and insulating the trolley wire.

One of your tower wagons, out on a work trip, has probably carried a member of the O-B organization. And perhaps your bonding gang has taken another O-B representative along on a job.

It's the duty of O-B Designers to know field conditions at first hand. Swivel chair theories have no weight with them. Their designs fit the midnight maintenance and rush hour repair emergencies that your men must face.

O-B Specialists pyramid the knowledge they pick up on your road, on the property in the next town and in a city half way across the continent. You get the sum of it all in O-B Products—and in the specialized knowledge and assistance which O-B Engineers are always ready to focus on your particular difficulties.

O-B Track Materials include many types and sizes of stud terminal arc weld and gas weld rail bonds; bonding tools; arc welding equipment for bonding, general repair and rail welding; and third rail insulators.

Interested in Trollibuses?

Naturally, a new thing like trackless trolley brings new problems. The O-B organization will be glad to discuss the situation with you—with particular reference to the trolley material required and the method of current collection.

See also page 171

The Ohio Brass Co.
Mansfield, Ohio, U.S.A.

New York Philadelphia Pittsburgh Charleston, W. Va. Chicago Los Angeles San Francisco Paris, France

Products: Trolley Material, Rail Bonds, Electric Railway Car Equipment, High Tension Porcelain Insulators, Third Rail Insulators

Miami, Florida, Magic City Is Progressive By Installing

Where the balmy breezes blow, and where every city is striving to outdo the other in the manner of making its own city the most attractive to wealthy tourists, sojourners and to the traveling public generally—"Elreco" combination Poles were chosen to improve and beautify the streets, thus doing away with the dilapidated wooden poles and unsightly cross arms and numerous wires.

The entire absence of car tracks in the foreground of this picture only proves the wisdom of the City Fathers in planning for the future and in anticipation of the time when all streets will be used by safety cars in city service.

You can profit by Miami's experience and adopt the "Elreco" pole, for carrying the span wires, the lighting

ELRECO

# of the South, Proves That It "Elreco" Combination Poles

and commercial circuits, as well as railway feeders; and in addition utilize the same pole for supporting the latest style General Electric Lighting Units on neat and ornamental brackets.

All wires are overhead—no expensive underground construction necessary and no lamp standards required.

We will gladly give you an estimate covering such improvement for your city.

Note—All old wooden poles shown above have since been removed.

Electric Railway Equipment Co.
Cincinnati, Ohio
New York: 30 Church Street

Combination Railway and Lighting Poles

FLOOD CITY

Trolley Line Specialties

Their Success in Coal Mines Caused Adoption by Railway Lines.

Trolley Wheels

Bushings

Section Insulators

Section Switches

"Everlast" Rail Bonds

Developed under the severe conditions of mining service, where inspection is difficult and infrequent, Flood City trolley line specialties and "Everlast" Rail Bonds offer a superior quality product for electric traction companies. Flood City materials are built to "stand the gaff" and their extra long life cuts maintenance costs and reduces depreciation burdens.

Let us submit quotations on your next requisition for this class of supplies.

Flood City Manufacturing Co.
Johnstown, Pa.

"DO IT TODAY" SUGGESTIONS

Strengthen Your Iron Poles at the Ground Line Before the Winter Storms Come

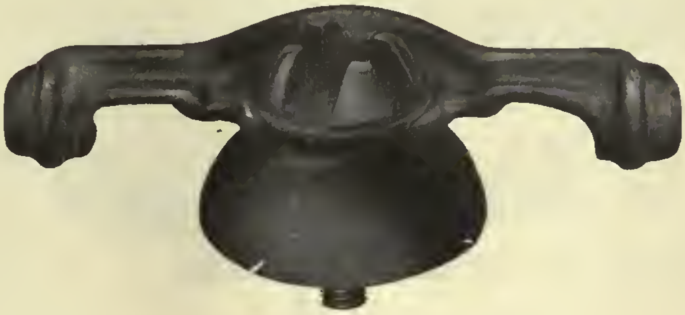
Don't wait until the furious winds of winter lay flat some of your poles—overstrained with ice-laden wires. Groundline corrosion eating away at every pole renders them dangerous to life and limb, as well as a menace to your continuity of service.

DREW POLE SLEEVES

make your corroded poles good as new and your new poles permanently safe.

The interlocking slide feature renders the application of Drew Sleeves quick and easy without disturbing the overhead. Made for all size poles. Every sleeve saves a pole—and that's a considerable saving, too. Write for quotations.

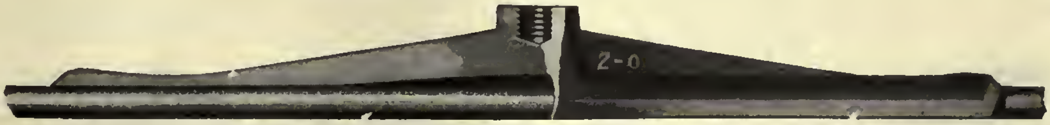
ELIMINATE
THOSE
LOOSE
EARS



HOW?

By adopting as standard equipment the

DREW FLOATING BELL HANGER



Stop that pounding under the boss by the use of

DREW CUSHION EARS

Note the deeper groove under boss which prevents flattening and saves the wire.

OVERHEAD LINE MATERIAL OF MERIT—DEPENDABLE—ECONOMICAL

Upon the grounds of service we solicit the business of electric railways for overhead material. In the design, the manufacture and the shipping of DREW materials, it is our desire to do it in a way which will improve the relations between our customers and ourselves. We will be glad to have the opportunity of furnishing you further detail information regarding our products, samples for inspection and test, or quotations. Let us serve you.

DREW

The Drew Electric & Mfg. Company
Cleveland, Ohio

DREW

ANDERSON

equipment helps to sell transportation by *preventing delays* that annoy the public

Anderson Crossovers prevent delays by eliminating the breaking of the trolley wire at crossover points

They insure long wear of both crossing and wires. The approach ears of bronze are pivoted to the main casting. This permits them to rise slightly with the approach of the trolley wheel, thus taking the wear off the wires at the points subject to greatest injury. This prevents crystallization and the subsequent breakage at those points.

Lindall Brush Holders prevent many delays due to motor trouble

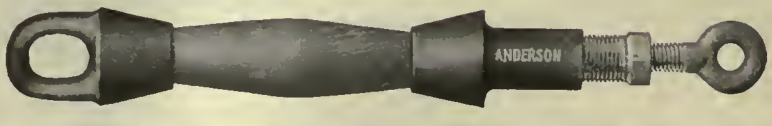
They guarantee constant brush pressure and this assures sparkless commutation.

Anderson Round Top Straight Line Suspensions prevent delays due to breakage from line contractions

Their great mechanical strength prevents the annoyance due to breakage which often comes with the inevitable wire contraction in winter. Also line foremen prefer them because they prevent creepage troubles.

Anderson Canopy Switch prevents delays by quick action

And because they never stick they have replaced ordinary circuit breakers on thousands of cars.



Anderson Double Takeup Wood Strain Insulators help to prevent delays due to guy wire evils

They take up the slack in guy wires without any twisting effect. The double take-up feature cuts the adjustment time in half. And good insulation, high tensile strength and perfect adjustment assure the right operation of the guy wire which prevents delays from mal-alignment of the trolley wire.

TRADE MARK
Reg. U. S. Pat. Off.

Albert & J. M. Anderson Mfg. Co.

Established 1877

289-293 A St., Boston, Mass.

Branches—New York, 135 B'way. Philadelphia, 429 Real Estate Trust Bldg. Chicago, 105 So. Dearborn St. London, W. I., 191 Tottenham Court Road.

TRADE MARK
AETNA
REGISTERED

Of Course You Can Avoid This

UNWARRANTED layovers that result in irregular schedules, unnecessary high speed, damage to equipment, waste of power and dissatisfied patrons *can be avoided.* A Nachod Headway Recorder placed a few blocks from each terminus is the simple remedy.

Nachod Headway Recorders Check Car Movements Automatically

Unfailing vigils throughout the day and night recording impartially and without prejudice the exact time that every car passes a given point. Nachod Headway Recorders enable you to maintain even schedules, equalized loading, discipline of men and the highest efficiency of operation. Like automatic inspectors, they deliver to you each day, in graphic form and with invariable accuracy, a complete history of all car movements at points of installation during the twenty-four-hour period preceding.

Easy to Install, Simple to Maintain, Economical in Practice

Nachod Headway Recorders require no coaching, no humoring, no adjustments, no technical knowledge. A daily winding and change of record are the only necessary attentions. The mechanism is simple, dependable, durable. The cost of operating is practically nothing and the purchase price of Nachod Headway Recorders is offset many times by the obvious economies resulting from their use. Write for particulars. Nachod Signal Co., Incorporated, Louisville, Ky. Manufacturers of Automatic Signals and Headway Crossing Bells.

Nachod Headway Recorders

MAKE ONE-MAN CAR OPERATIONS SAFER

with—

U. S. ELECTRIC SIGNALS

A single operator, responsible for the entire work on one-man cars, has a lot of things to look out for—collecting fares, punching transfers, opening and closing doors, making out reports and keeping the car on time. Add to all these the meeting of cars on turnouts, and there is a hazard which must be guarded against. The human memory sometimes fails.

But with single-track operation safeguarded by U. S. Electric Signals, which positively indicate not only the presence of any other car in the block, but also its direction of travel, you have the human element—the chance of forgetting—eliminated.

Remove Risks with U. S. Electric Signal Equipment

A generation of success in signal specialization stands back of United States equipment.

UNITED STATES ELECTRIC SIGNAL COMPANY

West Newton, Massachusetts

Representatives:

Western: **Frank F. Bodler, Monadnock Bldg., San Francisco**

Foreign: **Forest City Electric Services Supply Co., Salford, Eng.**

Depreciation is Greatly Reduced with Bates Steel Poles—Every Inch Accessible for Painting

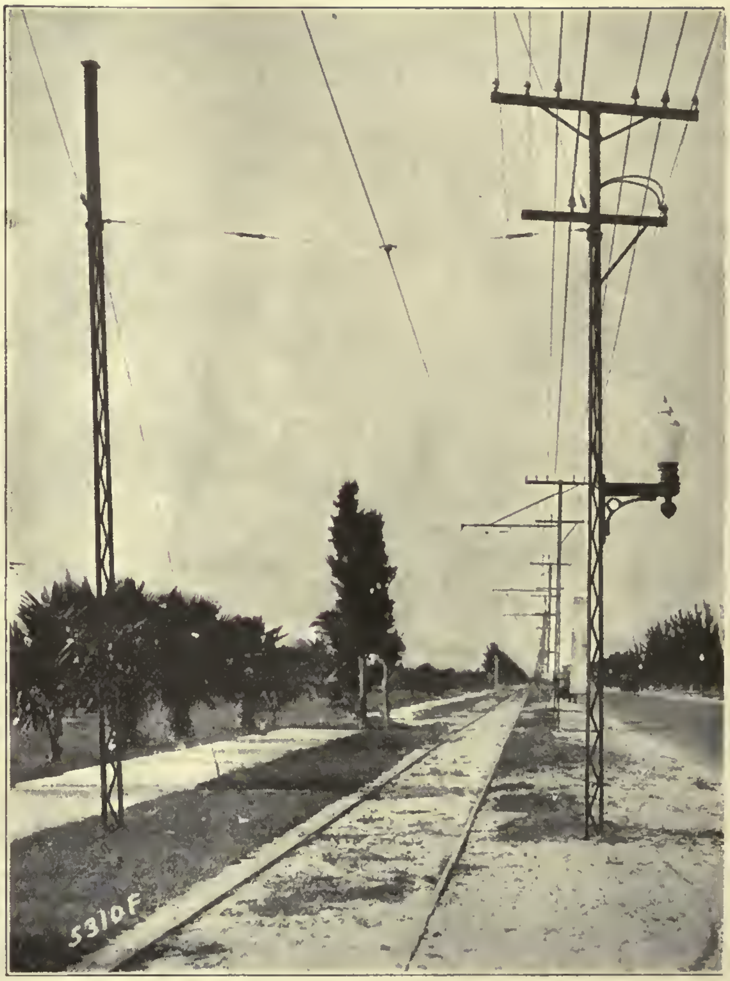
BUILD **permanent** pole lines with Bates One-Piece Poles and save money — in first cost, in fixed charges and in maintenance expense.

In addition to their great economy and utility Bates One-Piece Steel Poles are extremely artistic and enhance the appearance of any street. This is especially important in trolley construction.

Consider the installation at Miami, Florida, shown in the illustration. There was an initial saving of many dollars per pole compared with any other steel construction. This reduces interest.

Every pole is tested at the factory and is perfect. This reduces maintenance. And last, but not least—Bates Poles, with ornamental lighting units, add to the attractiveness of the streets of the city.

Investigate the possibilities of saving, service and beauty obtained by using Bates Poles for your lines.



The 1921 Bates Steel Pole Treatise contains 128 pages of intensely interesting and practical material. This is a complete handbook on pole line construction. It contains every formulae and all of the data required for the quick and correct solution of any pole line problems. It is free to all interested in better pole line construction. Write for your copy today.

Bates Expanded Steel Truss Co.

208 South La Salle St.
Chicago, U. S. A.

DOMESTIC REPRESENTATIVES:

Boston: 629 Old South Bldg
Rochester: 119 Main Street East.
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Indianapolis: 518 Traction Terminal Bldg.
Milwaukee: 453 East Water Street
St. Louis: Railway Exchange Bldg.
Minneapolis: 310 Security Bldg.
Denver: 1633 Tremont Street
Salt Lake City: 59 W. Broadway
San Francisco: 589 Howard Street
Los Angeles: 616 Title Ins. Bldg.
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Australia: Sydney, N.S.W.
India: Jost's Engineering Co., Ltd.
Dutch East Indies: Lindeteves, Inc.
England: M. Samuel & Co., Ltd., London, E. C.

Bates One-Piece Steel Poles

The AUTOMATIC TRACK SWITCH

Type 16

SIMPLEST—SMALLEST—LIGHTEST CONTACTOR

Contactor mounts on standard ears without straining or bending trolley wire. No moving parts.

CURRENT CONTROL

Device in pole box automatically cuts current off coils when switch operates. No more burning out of coils unnecessarily.

Write for information.

UNITED STATES
ELECTRIC SIGNAL COMPANY
West Newton, Mass.

Why Electric Railways Must and Will "Come Back" and How

By E. C. PRICE

Vice President, The Indianapolis Switch & Frog Co.

TRANSPORTATION, the greatest factor in the development and growth of towns and cities and vicinity or country, is probably the least appreciated. Its value and the part it plays in all lines of activities, cannot be conceived by the minds of the present generation, as they have never been without Transportation in a relatively high developed state, compared to conditions when the problem was first pioneered.

The masters of transportation have constituted and still are a fraternity, more or less isolated from the general lines of operation of the country. This partly because the transportation business is a special line of such magnitude—and so problematical, that it must be self-developing. As a "Servant of the Public" with a schedule, it demands a constant and intensive programme on the part of the personnel, both operators and operatives, naturally separating them from those in other lines of diversified activities.

Comparatively few people have an idea of the vast amount of capital involved, the superlative ingenuity and intellect required, and the strenuous work constantly involved in the building and operating of the various institutions that constitute our modes of travel.

THE Street or Electric Railway, serving the residents of cities and communities, is one separate department of the great transportation scheme—it directly affects the greatest number of individuals, and upon which they are almost daily and nightly dependent.

The Street Railway is no exception to any other of the transportation units. People have become so accustomed to it that they accept its presence and service as a "Matter of course," with which goes "Lack of appreciation," then "Criticism," and finally "Persecution."

The history of most localities, seeking to develop and progress is, that the citizens have urged, induced, encouraged and persuaded Capital and Masters of Transportation to put them "on the map" even before the possible revenue would justify the expenditure and effort.

HISTORY further shows, that with transportation facilities, a marked growth is soon and constantly in evidence. On the strength of this prospect and knowledge, cities and communities were given their first lift, which was then appreciated, but their children's children never knew, or if they did, have forgotten—and like the warmed-up wasp—are much disposed to sting the benefactor.

It is not reasonable to conclude that citizens are so intentionally ungrateful and that some change also in the attitude or performance on the part of the Operating Company, may not have played some part in the change of relations—but it is clearly evident that something is fundamentally wrong. Whether it is due to forgetfulness or unappreciativeness on the part of a "satiated" public; or thru negligence or intrigue on the part of the Operating Company, there is only one thing to do as a matter of self-preservation and mutual profit and benefit to all concerned. That is, get together!

The interests are common. Confidence and Co-operation will make possible a clearing up of all the obstacles that now make it practically impossible for Street Railways, as a rule, to give adequate service, operate economically and insure for capital a safe and profitable investment.

THRU confidence and co-operation, the public may be enlightened. It will know the value of and come to a sense of appreciation of one of its greatest assets, if not *the* greatest in its commercial and civic environs, withdraw its antagonism, be at least neutral if not helpful.

A review of the status of a city or community, and the provisions of the original franchise before having its transportation facilities, and a comparison with the present situation would be very enlightening. It would display in a very convincing manner, numerous gross inequalities that have unconsciously accumulated, also some results of antagonism.

Originally, few streets were paved; the lines were laid to serve "sections" of the city; the populace regularly and almost universally patronized the carrier, adapting themselves to a reasonable schedule. Then the city officials, the municipality, the patrons and public in general, were appreciative, reasonable and co-operated with the carriers.

Since that time, most streets have been paved and made tractable for other vehicles (and largely at the expense of the Railway Company in a majority of instances, not only for the original installation, but for maintenance and renewal).

NUMEROUS lines, almost to duplication are required and demanded on nearly every other street through a section. The populace, thru the use of paved streets and automobiles, withdraw their patronage, electing to use the cars on occasional bad days throughout about nine months of the year. When they do ride, they expect a schedule that will

Continued on following pages

pick them up without waiting at any place and at any time.

Now the Public in general is unappreciative, unreasonable, and if not antagonistic, is indifferent.

Originally the rate of fare was not determined by calculation or in relation to cost or service, but was popularly fixed at a "Nickel," whether for a square or ten mile ride. It was the smallest "round number" coin of convenient circulation. Regardless of contingencies, hazards and changes in all other lines of value, the "Nickel" habit became fixed in the minds of the public. It cost more and lost the operating companies more to raise or change the fare than the increase amounted to, all thru hostilities of the public to preserve a limit of the traditional "Five Cents". The litigation, the suspension of service, the boycott of riders, made bad matters worse.

There has not been evolved a higher scheme of mathematics that can show profit or anything but bankruptcy, depletion and failure, where the income is fixed and limited, (except as to decline) and the expenditures augmented all along the line, in demands for expansion and refinement, as in the case of street railways, which are penalized for the privilege of serving the public at cost minus.

THE facts above outlined are not common knowledge to the average citizen or the masses, and thru ignorance, or lack of a realization of these facts, it is very plausible that their imagination runs in adverse or converse lines.

Publicity of the right sort would clarify the situation and gradually be reflected in a change of heart, paving the way for the solution to the now greatest problem, that of transportation.

Publicity of the right sort will be facts, plain and ungarbled—both the public and the operating companies must "Disarm" and complete confidence must be established in common.

Politics, graft, promotion and manipulation, must be out of the cards in the new order of things.

Conditions as they now exist are not all the fault of the public, but the aftermath of some high handed policies and practices of the Operating Companies, the fallacies of which are now clearly evident and abandoned by all those who expect to "Come back."

Many roads were promoted solely for big profits; many were grossly mis-managed, but the most prevalent contributing factor of all, was the policy of allowing the public to remain in ignorance of the very facts, which, as given in outline above, would have prevented the forming of a public opinion so adverse to the Railways.

THERE was a disposition to keep the public in the dark, to dictate rather than confer and reason, in short the public lost confidence in the operators. They magnified coolness into collusion; they misunderstood; they questioned motives; the breach widened—then the fight began. Both sides working along destructive lines culminated into a state where Operators as a matter of self defense were forced to extremities. This gave just cause for complaint from the public, as they saw the conditions.

Let it be admitted that the fault or faults both directly and indirectly are evenly divided. Take the average conditions as a whole, and admitting also that the interests are mutual and common to both. The cities and communities face impairment thru lack of wholly adequate Transportation facilities and the operating companies face not only unprofitable operating, but abandonment and almost total loss of investments. A drastic change and reconstructive adjustment is imperative.

Co-operation and confidence are the fundamentals. Publicity must be predicated with a mutual agreement on the part of both parties with stipulated elastic conditions that will make possible **adequate and reasonable service**, an evidence of **competent and economical management**, and an assurance of **safety and profit for investment of capital.** There must be concrete evidence that will convince the public that both municipalities and operating companies merit the confidence, ability and intentions as displayed in the publicity, which if backed up with the goods, will create and maintain a spirit of co-operation that will be felt and helpful, to both parties alike.

ADEQUATE service: In the new order of things, greater emphasis will be laid on the necessary, and more discrimination on the non-essential or habit requirements, as the Country proceeds into a line of economies vs. extravagances. Comfort and Convenience pyramid when not measured by the necessary. A schedule, carrying light loads at minimum rates, all during the "off hours" is not economy. Less frequent, or a higher fare during such hours, would be economy.. Nothing less than ample seating capacity, properly heated and ventilated, sanitary cars, are economical at any price. A well surfaced track, safety at crossings, considerate and courteous treatment, begets good will and establishes patronage.

Competent and economical management. Owing to the great diversity in local conditions, the size of roads, usually operated within and by themselves, without any interconnection with other lines, the benefits of standardization were not available. Many roads starting without precedent or past experience, made grievous errors, which have followed them as a handicap. Smaller properties as well as those handicapped did not admit of a complete personnel as an organization. Neither were they attractive to competent men of executive and engineering ability.

The present condition of track and rolling stock of countless roads, whether thru lack of current funds or short sighted policy, reflects the toll exacted thru "deferred or accumulative maintenance." The interruption to traffic, as well as the inaccessibility of joints in paved street, as well as the excessive expense attached, accounts for allowing the track to gradually become in such condition that it impairs the paving, annoys the patrons, destroys the rolling stock, as well as wastes current, and causes numerous damages thru electrolysis.

THE old adage of a "stitch in time," was never truer of anything than the tramway of city cars. The heavy toll was taken when the rails so impaired as to require relaying entailed an enormous outlay for new material and repaving. The same applied to special work, such as curves, frogs, crossings mates, etc. Maintenance and renewals are the one most constant and greatest item of operating.

About ten years ago, a new process and method was evolved and developed which came to the rescue in the maintenance and construction problem, to which many roads owe their present existence and thru the employment of this practice, have been able to maintain and use the old track and rolling stock. Few roads now fail to exercise the economies of "Reclamation," by which with an expenditure of from 1% to 10% of the cost of renewals—and without interruption to traffic—have been able to defer the purchase of millions of dollars of material, which if required to have purchased, they could not have paid for out of the operating revenue.

Some managers have an idea that retrenchment is to stop off practically all expenditures—let everything run down—and "get by" until business and general conditions improve. By that time their property is so run down that it is beyond repair. A far greater expenditure in the end is necessary than if the economics of Reclamation had been applied.

OF the important street railways in the country about five hundred are now employing the method brought out by the Indianapolis Switch & Frog Co. By this method Special Work—both of rail and manganese construction, as well as cupped rail ends, worn curves etc. are welded by the metal electrode process, brought back to a condition as good and in many instances better than new. Especially in the case of rails is this true. When welded with a special hard steel to fill in the worn down ends, rails are "Armor plated," or given a wearing quality equal to that of manganese.

A stretch of track in Springfield, Ohio, (the home of the Indianapolis Welder) was welded in this fashion in 1912 and while under heavy traffic ever since, shows no impairment or wearing down. Special work so treated has, as far as observed to date, given at least double life. The cost of reclamation was in most instances less than would have been the cost of installation "labor" of new replace material.

Possibly the greatest savings have been effected by the use of the Indianapolis welded joint and bonding plates, taking the place of mechanical bolted and separately bonded joints, in paved track.

The practice of welding joints had heretofore been confined to the largest properties—but this method was made available to all properties regardless of the size or mileage. One joint either for repairs, or a thousand, as is the case of new construction, is practical and less expensive than the fugitive type of joints and bonds formerly used. Tests made by Robt. W. Hunt & Co., the U. S. Bureau of Standards, as well as the experience of the roads using this equipment, have shown greater electrical conductivity (without the addition of a bond) and less deflection under load, at the welded joint, than in the rail section itself. The permanency and efficiency of a joint of this nature and one that practically eliminates maintenance, makes for one of the greatest economies in the construction, operating and maintenance of a street railway.

THE Indianapolis Apex and Simplex welded joints, have been recognized and adopted by hundreds of street railways. Many of these roads have installed between five and ten thousand joints. A wonderful saving in maintenance with corresponding benefits has resulted. Thru having a smooth riding line—wear and tear on track, paving and rolling stock have been reduced to a minimum and patrons pleased.

The Indianapolis Welder is of the Resistance type, taking its welding current direct from the trolley wire. It is simple in its operation and durable. Welders installed in 1912 are still under service and cost about an average of 75 cents per month for upkeep, making it a practical outfit that any one of ordinary intelligence can operate successfully and economically. The simplicity of operating together with the employment of a special fluxated quality of treated steel electrodes produces a class of welding adapted for all purposes, including repairs to rolling stock and power plant equipment.

Many economies have been installed in the power plants, yet with recent developments in the electrical field, complete new installations would effect final economy. The types of cars have changed; new equipment in this line is essential for both service and economy. Yet in either or both of these lines it calls for large expenditures which must precede the time of commensurate returns. Until capital is assured of fair returns and security, it will seek other channels.

THE Transportation business is one of hazards, contingencies, and of a permanent nature. Capital is not attracted to hazardous business when the returns are limited to equal or less than the yield in more stable lines of business or investments. Investors do not and will not commit their money for indefinite periods, with no assurance of returns, even of interest or principal.

This one thing, as it now exists, stands in the way of future development of Transportation. Even with all good intententions, recent inventions, strenuous economies and all of the constructive effort of competent and expert management, little of a permanent and lasting nature will be accomplished, in solving the biggest problem in the period of reconstruction and readjustment, that this country as well as the entire world is now entering.

Cities and communities, which can adapt themselves to the fundamental requisites, will surpass and stand pre-eminently ahead of such as still hold on to the old lines.

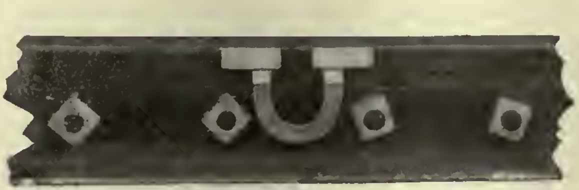
The first move must be tangible, and concretely expressed. Operating Companies must be relieved of super-taxes and assessment allowing for a graduated minimum rate of fares. If this is not done, a rate of fares must be established that will put the Transportation business on a stable footing.

ERICO RAIL BONDS

HAVE STOOD THE TEST

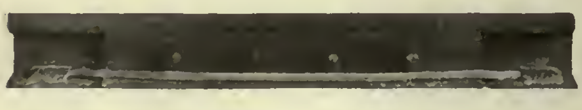
THEY HAVE GIVEN HUNDREDS OF USERS ENTIRE SATISFACTION

ERICO BRAZED BONDS are in a class by themselves, without a rival; they may be brazed on the side of the head of the rail or on the web of the rail either underneath or around the fish plates.



Type "ET"—Brazed Bond

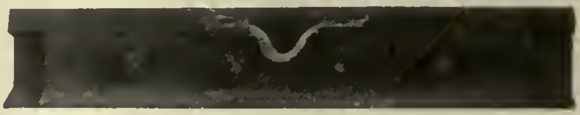
ERICO ARC WELD BONDS all have steel encased terminals electrically brazed to the copper conductor by a patented process, which insures maximum conductivity and durability.



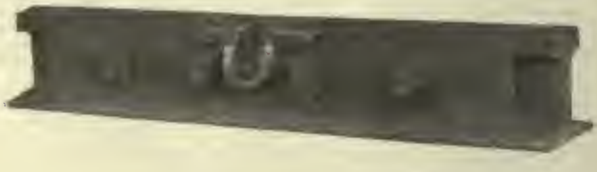
Type "A"—Arc Weld Bond

Long cable bond for use around the fish plates, cross bonding and special work.

Short cable bond for application to head of the rail, and especially adapted to "Weber Joints."



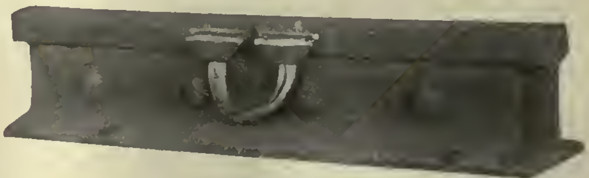
Type "AA"—Arc Weld Bond



Type "AU"—Arc Weld Bond

Ribbon bond for use on head of rail where preference requires a laminated copper ribbon conductor.

Bond with Drop Forged Steel terminals and twin conductors, permitting a higher arc current in welding them to the rail, thus speeding up their application, and allowing a novice to do the work without injury to the bond.



Type "ATF"—Arc Weld Bond

FOR EACH REQUIREMENT AN ERICO BOND TYPE—
FOR EACH TYPE THE LOWEST PRICE ON THE MARKET

The Electric Railway Improvement Co.
Cleveland, Ohio

In Track Construction Watch the Foundation

ARE you familiar with the type of track that is built *on the* foundation, instead of *in the* foundation? It means less foundation and correspondingly less cost. You can get this information by writing.

THE INTERNATIONAL STEEL TIE CO.
CLEVELAND, O.

Steel Twin Tie Track

Better Track for Less Money

ALL Steel Concrete Construction.

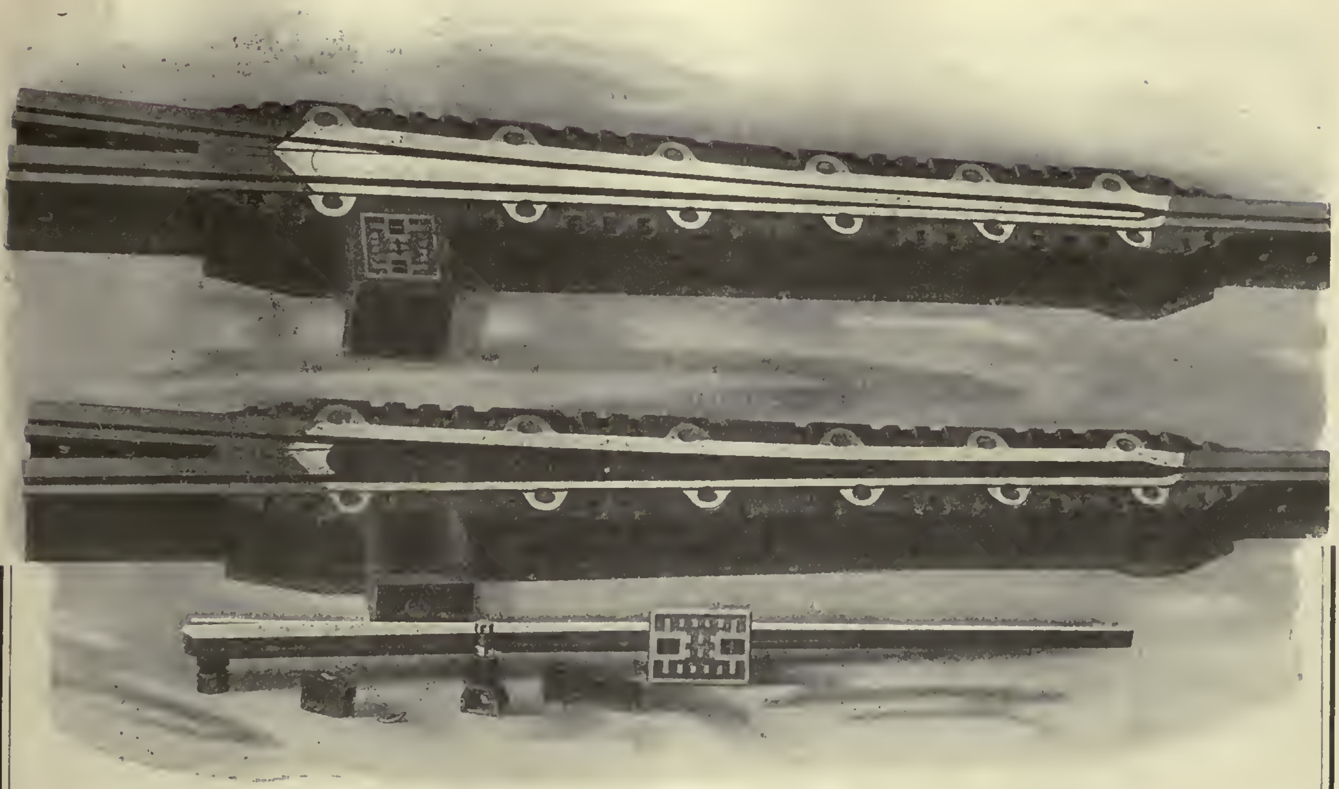
Minimum amount of material and labor required.

Less Excavation.

No place or material to absorb or collect moisture below street surface.

Literature and prices on request.

THE INTERNATIONAL STEEL TIE CO.
CLEVELAND, O.



Superior Switches, Mates, Frogs and Crossings

Curves, Turnouts, Cross Connections and Kerwin Portable Crossovers

Estimates Promptly Furnished

Write for Catalog

BARBOUR, STOCKWELL CO.

Established 1858

205 Broadway, Cambridge, Mass.

Armco Culverts

Economy of Transportation — Some conception of the economy of transporting Armco Culverts may be gained from the photograph to the left which illustrates a method of loading. This flat car contains 261 Armco Culverts ranging in diameter from 8 to 36 inches and having a total length of 4,470 feet. The weight, including 75 connecting bands, is only 60,495 pounds.

Easy to Carry—In smaller sizes and reasonable lengths, Armco Culverts may be carried by one or two men. The view to the left shows a man easily carrying a section of Armco Culvert 18 inches in diameter and 14 feet long. When larger diameters and greater lengths are to be moved into position, they may be rolled by a few men.

Easily Installed — No heavy, cumbersome and costly machinery is required for the installation of Armco Culverts. In numerous instances it is only necessary to dig a trench and roll the culvert in place. At times when it is not permissible to dig a trench across railroads or important highways, a tunnel may be dug under the roadbed and the culvert inserted.

Permanence Assured — The chemical purity, homogeneous texture and heavy galvanizing of Armco Ingot Iron, from which Armco Culverts are made, enables them to resist rust and the deteriorating action of soil or climate. The installation shown here was made under a dirt road in 1911—paved over as a permanent installation in 1913—and in perfect condition today.

TRADE MARK ARMCO Resists Rust Ingot Iron

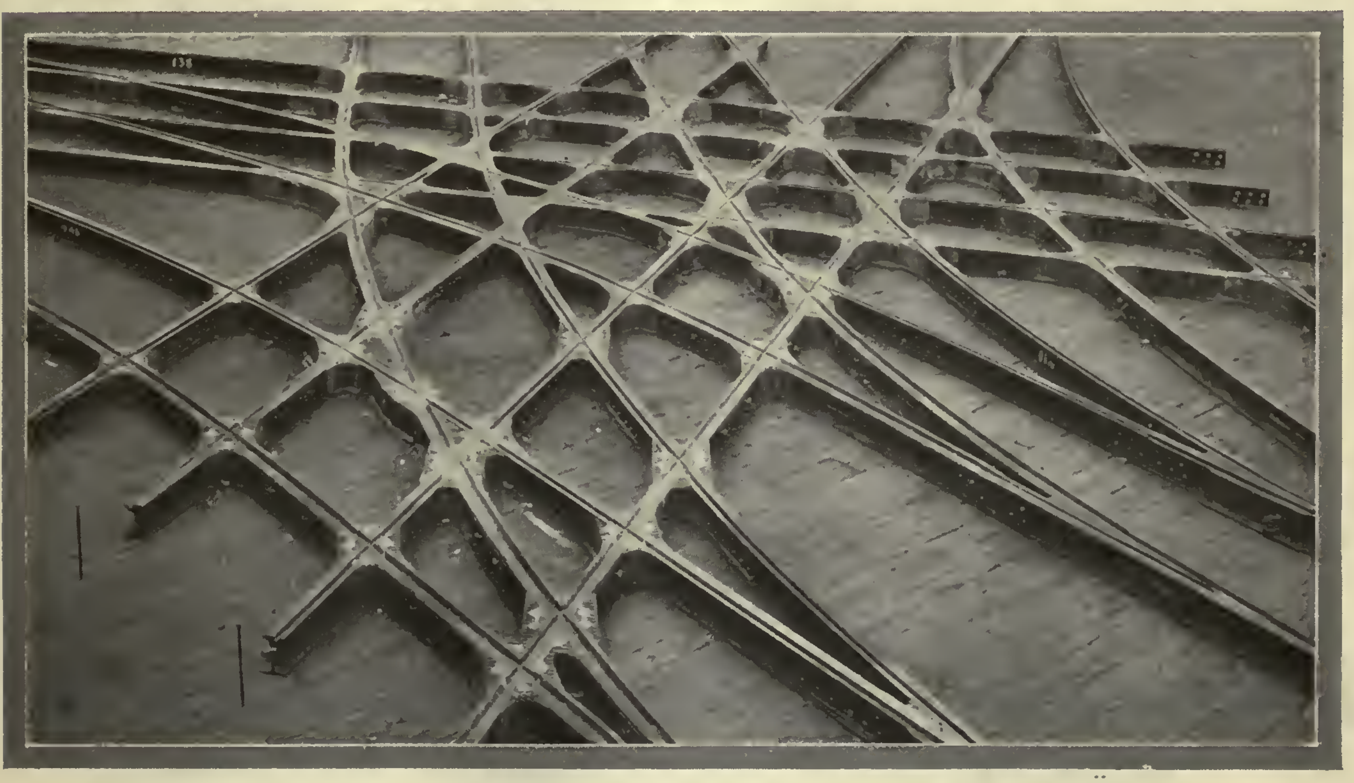
There is a manufacturer in nearly every state, and in Canada, making genuine rust-resisting ARMCO CULVERTS and other products of Armco Ingot Iron such as flumes, siphons, tanks, road signs, roofing, etc. Write for full information and nearest shipping point on products in which you are interested.

ARMCO CULVERT & FLUME MFRS. ASSN.

215 NORTH MICHIGAN AVE. CHICAGO

BUDA

ESTABLISHED
1881



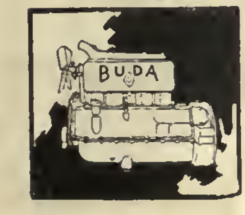
Special Track-work—a Buda specialty

WE KNOW, here at Buda, what the upkeep of electric railway tracking costs. And we appreciate what a problem it is for any street railway corporation to consistently pay dividends in the face of constant repair and replacement of rails and special trackwork.

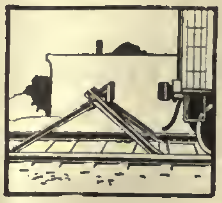
So we manufacture this product with a view to giving the user every possible advantage as far as wear, minimum depreciation and longevity are concerned.

THE BUDA COMPANY, Harvey (Chicago Suburb) Illinois

Truck and Tractor Engines



All Steel Bumping Posts



Hand Cars

Crossing Grates

Electric Trucks

THERMIT INSERT

By Absolutely Eliminating the Joint Makes

Let us know the section number of the rail which you wish to weld so that we can ship Thermit welding material suitable for the purpose. On receipt of an order for material and apparatus, we will send an expert demonstrator to instruct your men so that you can carry on this work yourselves.

Metal & Thermit Corporation,

RAIL WELDS

Rail Joints Last as Long as the Rail Itself

This is of paramount importance at the present time when railways must economize to the utmost and costly rail renewals must be reduced to the minimum.

As the Engineer of a large eastern property recently stated:

> *"The joint not only determines the life of the rail, but, in street railways, is responsible for a very large proportion of the maintenance charges on track and paving, as well as being a factor in accidents and the upkeep of rolling stock."*

In order to make the joint last as long as the rail, Engineers have logically turned to welding for the purpose of making the rail continuous.

Other welding methods, however, only partially solve the problem because the heads of the rail are not continuous. They simply weld fish plates or splice bars to the rails. Result: The joint eventually cups.

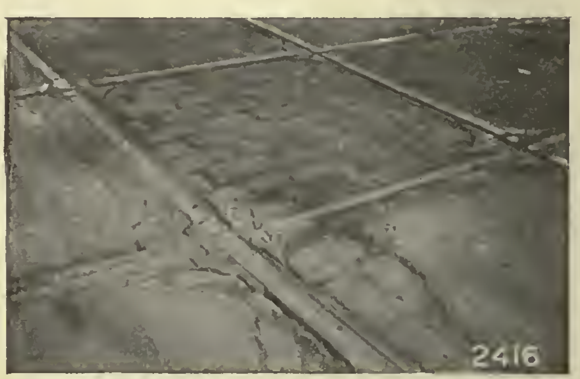
On the other hand, the Thermit Insert Weld is the only practical fully welded joint which absolutely eliminates the break between the rail ends. The joint is fully as strong as the unwelded portion of the rail and its electrical conductivity is the same as the rail itself.

Send for our latest Rail Welding Pamphlet 3932.

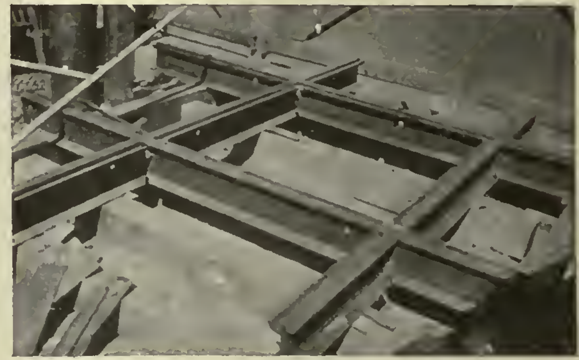
General Offices: 120 Broadway, New York

Pittsburgh Chicago Boston S. San Francisco Toronto

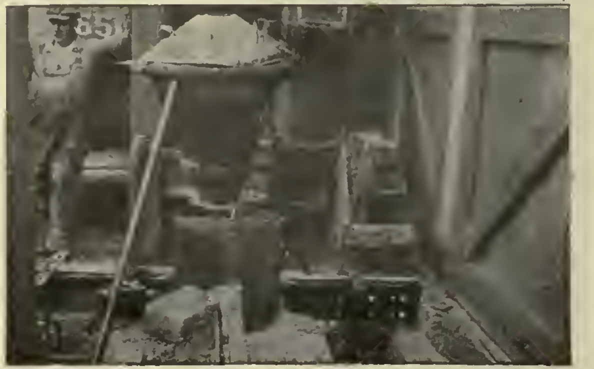
Build Low Cost Frogs and Crossings in
Welding, Using Spare Pieces



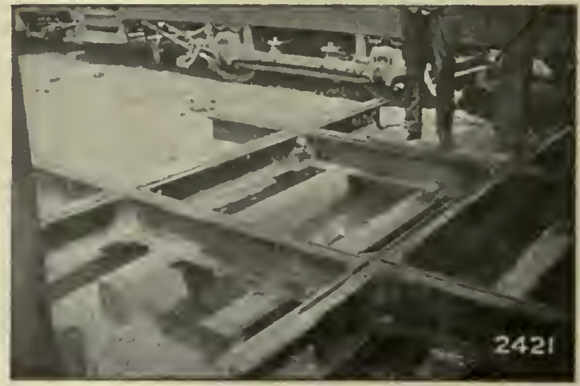
Worn out manganese insert crossing, Fall River, Mass., which was replaced by a Thermit welded crossing.



Rails cut out and assembled together in position.



Crucible set over mold, ready to start Thermit reaction.



Welded crossing, ready to be installed in street.

Steps in Constructing a Single Track Crossing (Fall River) by Using Thermit to Weld Frogs

Thermit welded frogs and crossings have been installed in about 25 different cities.

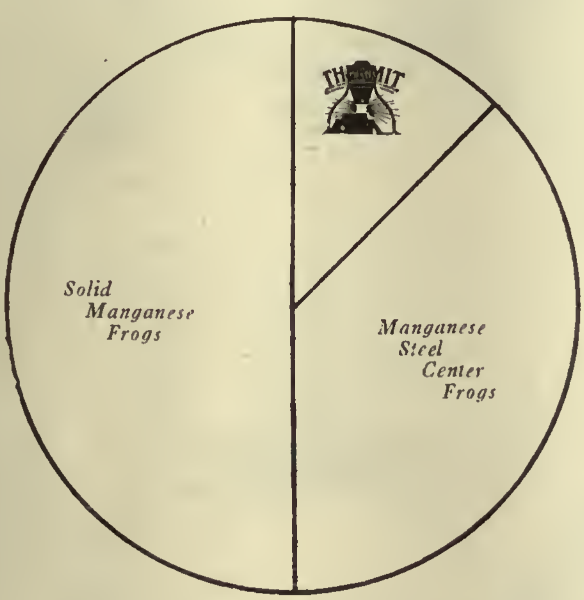
Thermit Outfit Useful for Other Welding Purposes

Everything considered, no street railway can afford to be without one of these useful and inexpensive welding equipments, or deny itself the advantages to be derived from making up its own special work, welding arms to broken mates, welding compromise joints when needed and for repairing broken car truck frames, electric motor cases and for other useful purposes too numerous to be mentioned.

Just think this over. Remember, these crossings are not experimental: the first ones which were made over six years ago are still in good condition and giving the most satisfactory service.

Metal & Thermit Corporation,

Your Own Shop by Means of Thermit of Rail You Have on Hand



Approximate Relative Cost of Thermit, Manganese Steel Center and Solid Manganese Frogs.

The cost of Thermit frogs varies only around one-quarter that of manganese center frogs; yet in practical service tests where Thermit welded frogs have been installed to replace broken manganese steel center frogs the Thermit frogs were found to have outlasted the insert frogs.

Thermit welded frogs, unlike solid manganese frogs, require no bonds at all when welded into place: also, unlike solid manganese, any damage to the joints can be repaired by the addition of metal by means of the electric welder.

Let us send you a Thermit outfit at once and let our experienced track engineers instruct your men in constructing a Thermit crossing by using simply the rail which you have on hand, your own track labor and the Thermit outfit and materials.

Send for our
latest Rail Welding Pamphlet 3932.

General Offices: 120 Broadway, New York
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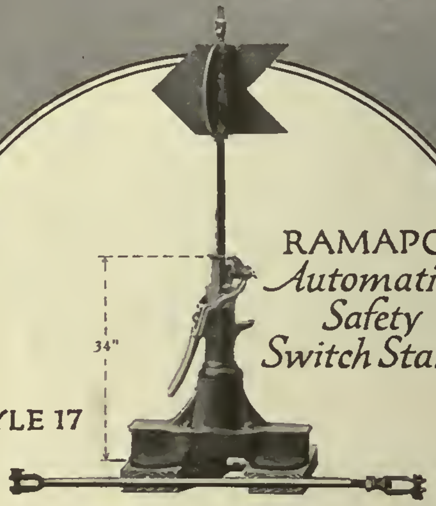
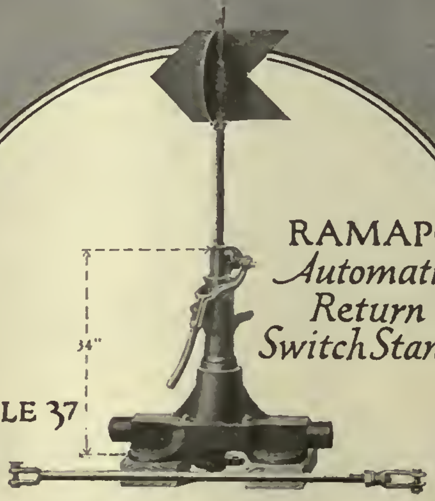
RAMAPO

Automatic Switch Stands



RAMAPO
*Automatic
Safety
Switch Stand*

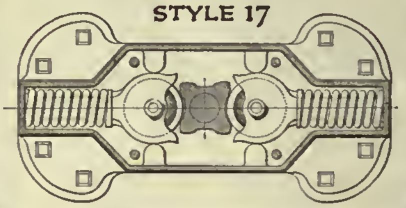
STYLE 17



RAMAPO
*Automatic
Return
Switch Stand*

STYLE 37

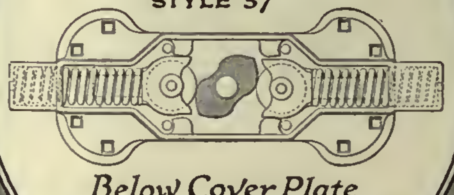
A Sectional View of
AUTOMATIC SAFETY
Switch Stand
STYLE 17



*Below Cover Plate
Showing Automatic
· Mechanism ·*

*These
Switch Stands
also furnished
in medium
Heights
· and ·
Dwarf
Styles*

A Sectional View of
AUTOMATIC RETURN
Switch Stand
STYLE 37



*Below Cover Plate
Showing Mechanism
· Half Thrown ·
Automatically*

TEE RAIL SPECIAL WORK *for* INTERURBAN
LINES *and* PRIVATE RIGHTS OF WAY

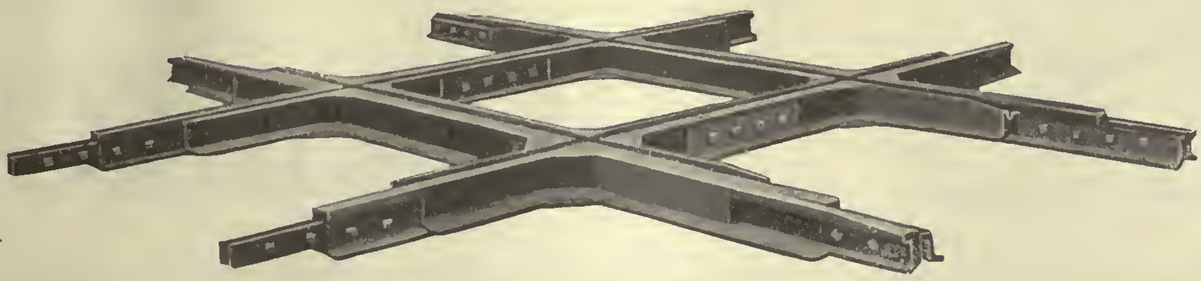
*Manganese Construction
Street and Steam Crossings a Specialty*

RAMAPO IRON WORKS

HILLBURN · NEW YORK

Plants at Hillburn, N.Y. *and* Niagara Falls, N.Y. *New York Office* 30 Church St.

Long Life Means Low Cost



Switches

Mates

Frogs

Crossings

Complete Layouts

Crossings of every description.

Solid Manganese—Balkwill Type—Insert—Iron Bound and Built Up.

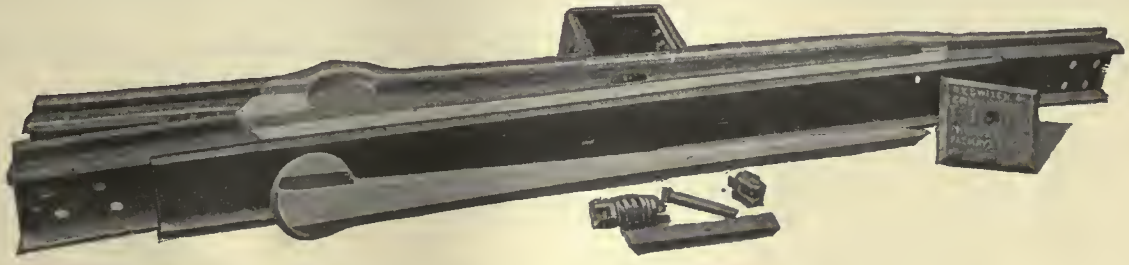
Track work that stays laid, stands long service and hard usage, reduces accident risks and losses to the minimum is the kind for YOUR cars to run over.

That kind of work is our specialty.

Improved Anti-Straddle Tongue Switches.

This is the only Pinless Tongue on the market. Perfect Fit—Heavily reinforced with 100% Bearing Efficiency. Tongue is securely locked in either position and car cannot straddle the Tongue. No complicated mechanism. No trouble to maintain.

In our standard Iron Bound Frog and Crossing Construction we furnish High Carbon Hammered Steel or Manganese Centers at your option. The Centers are securely set on Machined Bearings—and are put there to stay.



NEW YORK SWITCH AND CROSSING CO.

HOBOKEN, N. J.

"Tisco"
Manganese
Steel

SPECIAL TRACK
WHARTON

Two Views of a Special Trackwork Layout Manufactured by *Wharton* for M. & J. B. McHugh,

The switches, frogs and crossings in this yard have "TISCO" Manganese steel parts at points subject to severe wheel wear. Wharton was largely instrumental in introducing Manganese Steel elevated special trackwork in New

WM. WHARTON Jr. &

Originators of
Manganese Steel Track Work

SALES OFFICES:

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WORK of QUALITY

"Tisco"
Manganese
Steel

Contractors, and Installed in the Bridge Street Yard of the Frankford Elevated Railway.

York, Boston and Chicago, and a very great measure of its success may be attributed to the well known "TISCO" Manganese Steel. Let us solve your surface, elevated and steam railway special trackwork problems.

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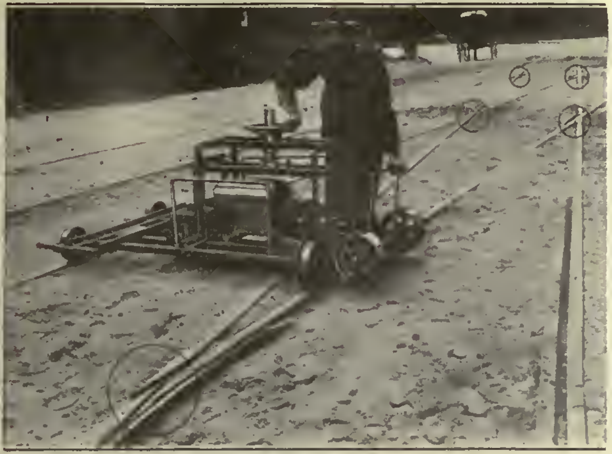

Five frogs (count them) all done in six days with the

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Portable Rail Grinder

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Not only in first cost, but for economy in accomplishing its work, and for freedom from excessive repairs and maintenance expenses, the MIDGET is recommended by railway engineers. Send for copies of testimonials like the above.

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ROLLER-SMITH
Bond Tester

Bar in place on "T" Rail Showing Saw Blade Contact

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Rapid — Reliable — Rugged

More than an ordinary resistance testing *instrument.*

An *equipment* designed for electric railways, where simplicity must be combined with ease and rapidity of manipulation. A moderately-paid employee, without engineering training, can use it and cover ground rapidly.

The contact teeth bite into the rail, insuring quick, accurate readings.

Bulletins G-200 and G-201 give full details. Send for them.

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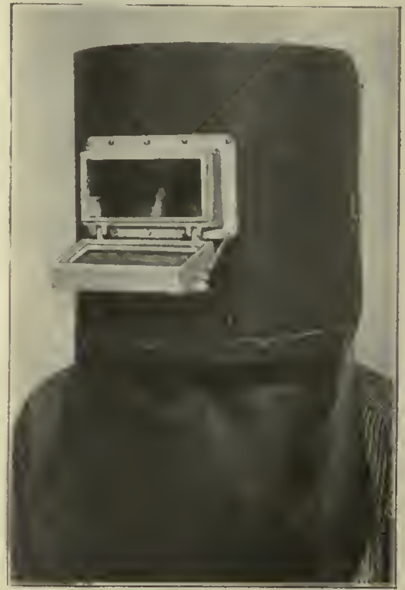

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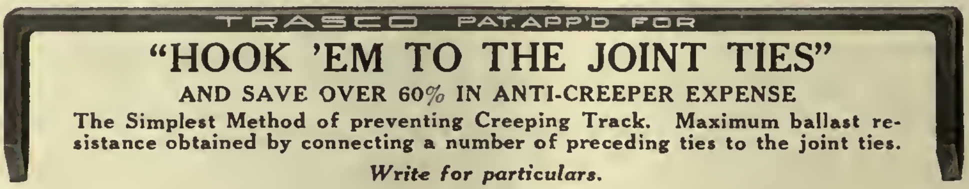

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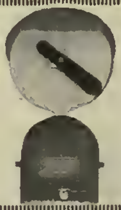

Mr. Carnegie's Success is, by himself, largely attributed to his fortunate choice of business associates and assistants. "Positions Vacant" and "Positions Wanted" columns bring together the man and the place.

Have YOU Given the Searchlight a Trial?

63

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Insulator Clamps

For all purposes.

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Of Seamless Copper (*Guaranteed*).

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Made by a special centrifugal process that insures their lightness and strength, Massey Hollow Reinforced Concrete Poles require no maintenance and provide a support which is pleasing in appearance as well.

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The most efficient and
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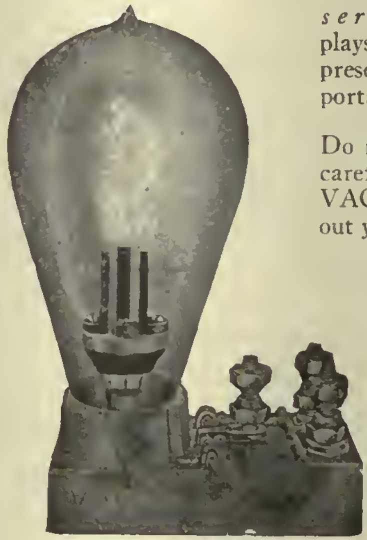

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VAC-M Lightning Arresters prevent high tension disturbances from interfering with electric train dispatching, and *smooth, uninterrupted service* unquestionably plays an important part in present day railway transportation selling methods.

Do not fail, therefore, to carefully consider the VAC-M when you map out your "sales campaign."

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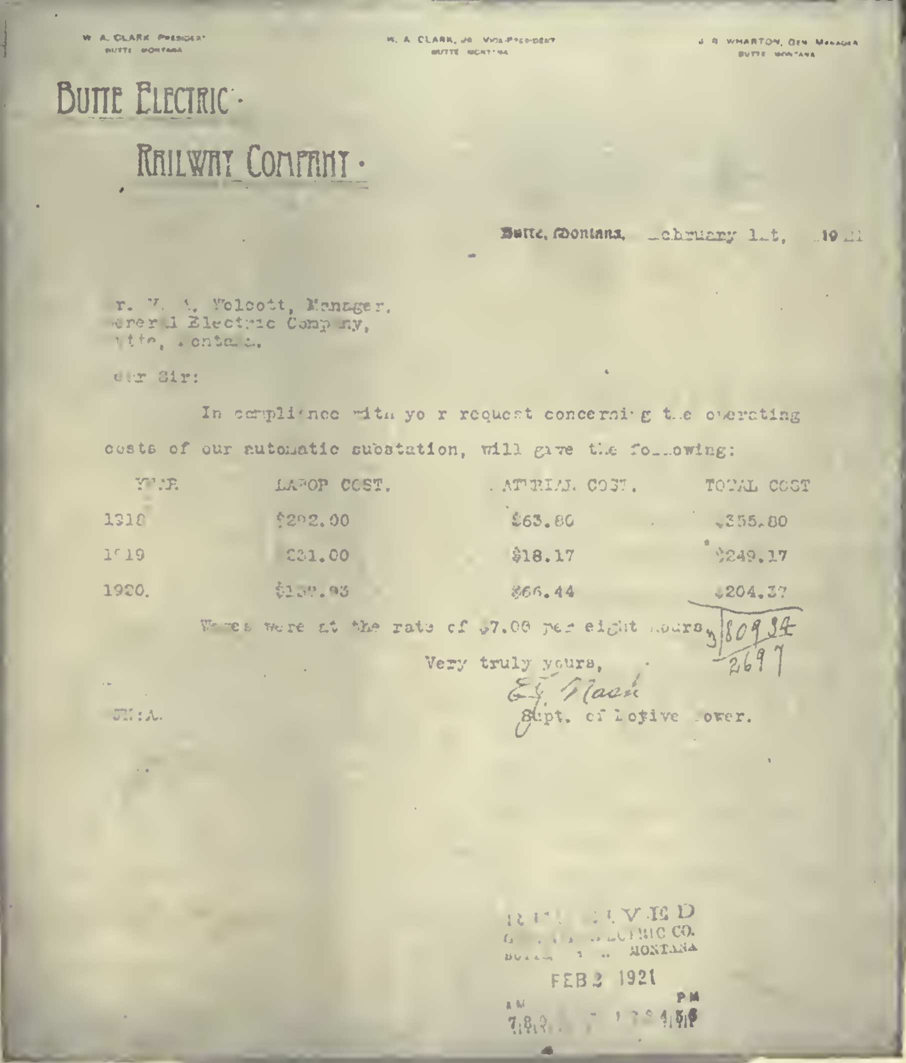
After all, the one conclusive proof of automatic station economy is a highly favorable actual performance record



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BUTTE ELECTRIC
RAILWAY COMPANY

Butte, Montana, February 1st, 1921

Mr. W. A. Wolcott, Manager,
General Electric Company,
Butte, Montana.

Dear Sir:

In compliance with your request concerning the operating costs of our automatic substation, will give the following:

YEAR	LABOR COST.	MATERIAL COST.	TOTAL COST
1918	$292.00	$63.80	$355.80
1919	$231.00	$18.17	$249.17
1920.	$137.93	$66.44	$204.37

Wages were at the rate of $7.00 per eight hours.

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Very truly yours,

E. J. Mack
Supt. of Motive Power.

JM:A.

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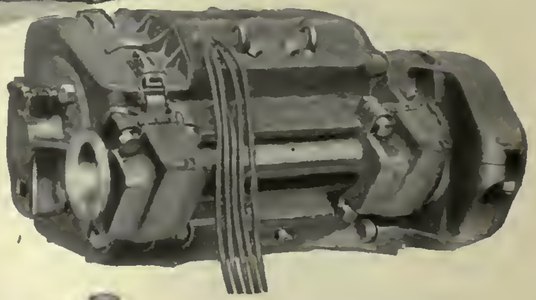
Today interurban electric lines, properly equipped, can successfully compete with steam railroads



G-E 254 Motor

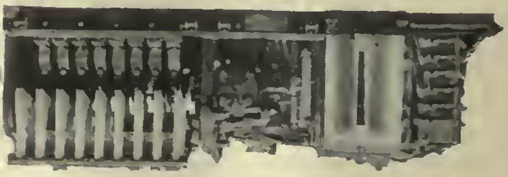
Dixie Flyer

THE Interstate Public Service Company has recently equipped its lines with the most modern high speed cars, designed to provide maximum passenger comfort and to make the run between Indianapolis and Louisville with a material saving in time over the fast steam trains.

General Electric substations, G-E-254 motors and PC-12 control are contributing to the success and reliability of this service.

Master Controller

Motor Controller with cover off



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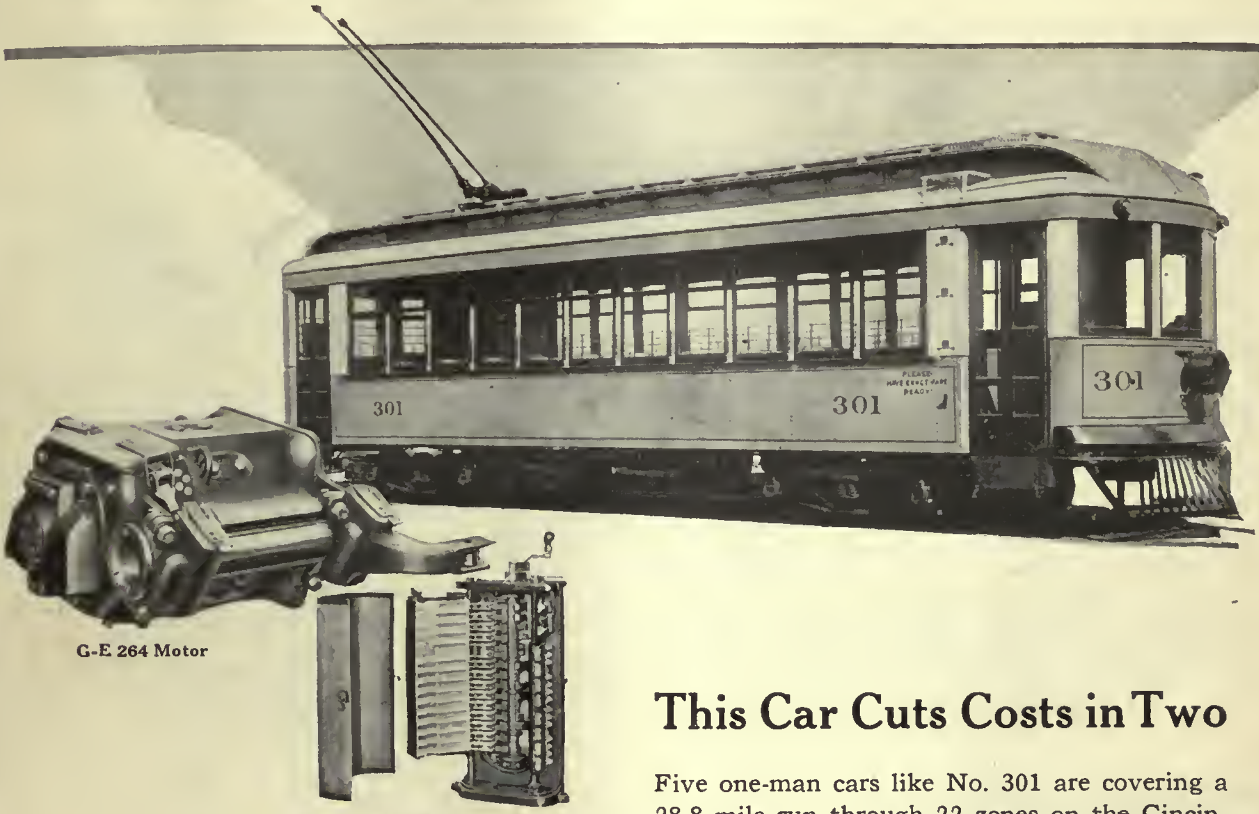
One-man cars in interurban service have a right to railway men's respect when they carry more passengers at half the expense of heavier equipment



G-E 264 Motor

K-35 Control

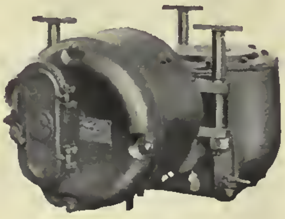
This Car Cuts Costs in Two

Five one-man cars like No. 301 are covering a 28.8 mile run through 22 zones on the Cincinnati, Milford and Blanchester Traction Company system. They weigh 15 tons, and carry 47 passengers, replacing two-men, 44 passenger cars weighing 30 tons.

These light cars with safety features have reduced power consumption 60 per cent and operating costs 40 per cent.

A part of their success must be credited to their equipment designed and built by the General Electric Company. These cars have G-E equipment throughout—G-E 264 Motors, K-35 Control, CP-27 Compressors, and J-12 Headlights operating from GECO Resistors.

"G-E throughout" is a sound policy for any railway. It unifies manufacturer's responsibility.



CP-27 Compressor

J-12 Headlight

GECO Resistor

25-106

General Electric Company

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all large cities

There is no surer way of keeping cars off the pit than by maintaining the original equipment quality of their wearing parts

A Time and Trouble Saver for the Purchasing Agent

The G-E Renewal Parts Catalog for car equipment makes it easy to order new parts with the positive assurance that such parts are exact duplicates of those supplied on the original equipment. Each part is pictured, titled and numbered.

In this catalog, compact yet complete, there is a separate bulletin for each piece of apparatus. It is always up to date, for as changes are made in the equipment, new sheets are sent out to be inserted in the loose leaf binder.

This Renewal Parts Catalog service is sent free to users of G-E car equipment. No purchasing agent can afford to be without it.

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General Electric

General Office
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Company

Sales Offices in
all large cities

"Better Salesmanship in Transportation" Issue

Electric Railway Journal

[Consolidation of Street Railway Journal and Electric Railway Review]

Volume 58 New York, Saturday, September 24, 1921 *Number* 13

Selling Transportation — the Subject of This Issue

MANY keen observers have declared that electric railways have not paid enough attention to merchandising their product. This may be because of a feeling that if good service was given business would come as a matter of course. Nevertheless, there is no doubt that business can be increased by attention to methods well recognized in other lines as desirable for stimulating trade. The reports during the past two years of the committee on merchandising transportation show at once the growing interest in this phase of the work and excellent examples of how to go about it.

It is the object of this number largely to tell what the sales department can do, what it should consist of and how all of the different departments can help in the sale of transportation.

One purpose of the sales effort on an electric railway should be to increase the riding from necessity riding to that which can be obtained if the riding habit is well developed in the community served by the railway. To secure this result the public should be saturated with the idea of the desirability and economy of riding. This is one of the duties, perhaps the primary duty, of the sales department, and for a nation which has the reputation of always being in a hurry, it ought not to be a difficult task in most cities by stressing the time-saving idea to increase the riding habit.

The owner or manager of a successful department store, however, does not stop at creating a desire in the minds of his patrons for merchandise of various kinds. He knows that that alone will not sell goods. He tries to meet the desire which he has created for the articles which he has for sale by putting the merchandise up in an attractive way. He must also charge an attractive price for it, although this does not mean that the goods must be sold at cost or less than cost. The price is not controlling in the sale of either transportation or general merchandise. Provided the goods are what are wanted and the seller has the reputation of being satisfied with a reasonable profit, the public is not apt to complain about the price.

It is here that all of the departments can help. To some, the connection between the track engineer and the sale of transportation may appear very far apart. Nevertheless the connection is very close. Bad track discourages travel. In like manner the superintendent of equipment, the designer of cars, the schedule maker and other heads of departments have an important influence over the popularity of the electric railway, in accordance with the efficiency with which they carry on their respective duties. They are helping to put the package of transportation up in the form wanted by the prospective passenger or buyer.

Finally, the whole organization should be inspired through the chief active executives with the sales idea. It will pay.

A Critical Demand for Financial Leadership

WHILE the present issue is devoted largely to a plea for sales leadership in the electric railway industry, a demand which is at least as critical must not be overlooked. This is the demand for financial leadership in the industry. It is less tangible to talk about; it is not something which can be expected of the whole organization as can salesmanship; it must be confined to and expected of only a very few of the higher executives, but the necessity for it—immediately—is very real. This idea is suggested incidentally, too, in Mr. Goodwin's article. In the composition of his board of directors it will be noted that a balance is suggested between the three groups of sales, financial, and engineering and operating. Engineering and operating talent the industry has and can be proud of. But Mr. Goodwin might have said as much about the necessity for financial statesmanship as he does of sales statesmanship in the directing personnel of the company.

Bankers, as such, are not what the industry needs. There is enough ready talent for the mere marketing of securities once issued. What is needed is real financial genius in the rebuilding of the financial structures of many companies. It is well recognized—emphasized definitely during the past few years of adjustment and readjustment—that the greatest load carried by some

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companies is the load of the existing financial organization. Not that it was originally faulty. It merely doesn't suit now. What to do can be determined only by real ability. Credit relief is necessary, but at best temporary; it will make the job easier. But the desirability—the necessity—of something more fundamental is evident. There must be constructive leadership in determining the most sound and practicable financial policies for electric railways.

From time to time special commissions investigate and report with suggestions. Public service commissions take a hand. Occasionally receiverships occur. All of these are mere symptoms. The real solution must be found from the inside. The opportunity and the obligation therefore rest on those now in positions of financial responsibility in the railway industry.

Come to Atlantic City Prepared for Discussion

WITH the advance papers in the hands of the membership and the convention so close at hand, it is greatly to be hoped that a large number of the members of the American Electric Railway Association are preparing or have already prepared discussions of the various committee reports. These, almost without exception, represent an amount of hard work little realized by those who have not served on the committees. The need of full and general discussion is particularly great in the case of the Engineering Association, for whether "standards" shall be stepping stones or stumbling blocks in an industry or art depends on careful determination and accurate statement. As in the case of the man who was in doubt as to whether to buy a camisole or a casserole, the answer depends on whether the "chicken" is "alive or dead."

A well-chosen standard represents the average judgment of the men who prepared it. But changes in materials and methods may materially alter conditions and so make modifications necessary; or misunderstanding, due to poor wording or what not, may demand a clearer expression. Knowledge of the need of these comes most quickly and best from the men who actually do the work.

Other years, at the booths, a large amount of most valuable practical information has been "swapped"; indeed, a good many consider these over-the-exhibits discussions more valuable than those in the regular sessions, and the latter have suffered considerably in consequence. This year, however, with no exhibits, and with special efforts being made by the association and by committee chairmen and members personally to secure comments, there should result such attendance and discussion as cannot fail to be most valuable, both to the association and to those who take part in it.

New Commission's First Important Decision

SIX CENTS is to continue to be the fare in Utica, N. Y. This is the decision of the new Public Service Commission in its first important rate case. In this late day nothing extraordinary in the way of interest attaches to a fare decision such as this, but in the present instance the case takes on special significance because of the standard of future action which is set down by the commission. Fault is found by the commission with the basis of value set up by the railway, and the pronouncement is made that "public utilities just as other departments of business must expect to cope with periods of depressions, just as at other times they enjoy periods of prosperity and full dividends." This is good as a theory, but in the case of the New York State Railways it does not appear that the company ever enjoyed any periods of prosperity and full dividends. Moreover, it would seem that the commission is oversanguine as to the results likely to be attained in reduced expenses through the use of one-man cars and by the general lowering of the prices of commodities needed by the railway in the conduct of its business. These are just a few of the things in which it would appear that the judgment of the commission is not likely to be approximated.

But whether or not the commission is proved to be correct in its judgment, the decision ought to set at rest the opinion which gained circulation during the session of the Legislature at which the new regulatory body was created that the public utilities would have an easy time of it before the incoming body. Coming as the ruling does almost on the eve of the November elections, the opponents of Governor Miller have been handed a resounding whack that will be heard through the length and breadth of the state. It may be that the New York State Railways will be able to accomplish under the continued 6-cent fare in Utica all that the commission anticipates, but if Syracuse, in which the same company is operating at an 8-cent fare, is any criterion, then the likelihood is remote of its getting on as gloriously in Utica as the commission expects.

Safety in Bus Design an Important Factor in Selling Transportation

IN THE PAST many patrons of the motor bus have commented seriously on the accident hazard of this type of vehicle. Fear of overturning, irresponsible driving, poor brakes, etc., have kept away many prospective passengers. During the past year considerable pioneering work has been done by the manufacturers of motor buses, as is evidenced by a glance at different designs of bus bodies published elsewhere in this issue. They show that serious thought has been given to the question of both chassis and body design from the standpoint of safety and comfort of passengers as well as for easy ingress and egress.

That there will not be, for a long time to come at least, a standard bus body for each of the several carrying capacities is probably more nearly the fact than with the case of the rail-borne vehicle. This is evident particularly when a study is made of the various chassis now in use in motor-bus operation. There are, however, several salient facts that seem to stand out as being of the utmost importance, and especially so if the bus manufacturers want their products used by the electric railway industry.

The railway executive has always made every effort to transport his patrons to their destinations in safety. This is one of the essentials in railroading. So, when considering the purchase of rail-less vehicles, his first thought will naturally be toward safety. Buses to meet this requirement must have a large factor of safety against their chance of overturning in case of skidding and striking obstructions or holes in the highways. While the method of rear-end drive has much to do with the question of the height of floor and the resultant center of gravity above the street, there is no doubt that the rear wheel tread should be widened out proportionately with the floor height to meet this requirement. What valid reason exists to make the rear tread of passenger carrying motor buses the same as the standard railway tread, namely, 56½ in.?

Another thought as to safety comes to mind, namely, the street accident or collisions with other vehicles. The bus being mobile and not tied to any particular course along the highway as is the case of the trolley car, the operator can by quick perception of the situation avoid many collisions. Not so with the operator of the trolley car. He can only avoid collisions by stopping unless the obstruction clears away. In the case of the motor vehicle there is a large proportion of accidents that can be eliminated if the vehicle could but be steered easily and the driver be able to take quick advantage of his distance. With a narrower front wheel tread, which will permit of quicker and shorter turns than if both axles treaded alike, the street accident liability can be reduced without affecting the factor of safety against overturning.

These factors, together with ample braking surfaces designed for smooth retardation, though sufficiently rapid to bring the vehicle to rest promptly without unnecessary skidding on smooth surfaces, and careful drivers so located that they have a clear vision forward and on both sides, should allay any fears on the part of the passengers or operators against increased accident hazard due to bus operation.

Modern Housing vs. Profitable Transit

THERE was a time when transportation lines for cities were, as a matter of course, run through the regions of densest population because their builders frankly were out to get a return on their investment. It is true that in the United States, particularly, many lines were also built through sparsely-settled districts, but in these instances the promoters generally were hopeful that the money-making density would come in time. No restrictions on the height of buildings or on the relation of open spaces to built-over areas were known or thought of in those earlier days of electric railroading.

Today the situation is vastly different. First of all there is a much greater interest in securing park areas and large open spaces around public buildings or civic centers. Second, and far more important, is the garden city housing movement. The projectors of garden cities deliberately plan for a density of population, say twelve per acre, which is far below the density required to make the city railway a profitable venture (approximately 200 is the figure for Manhattan Borough, New York). Third, the usual garden city is not the rectangular roaded affair for which trackways are most suitable, but is likely to be made up of curved streets following, more or less, the natural grades of the terrain.

It would seem from the nature of this development that while the city of the future will be more healthful for the inhabitants, it will offer less opportunity for profit-making transportation. Either of two results must flow from this change: Transportation must become a community affair in which the city absorbs all losses through the tax rate, or else the district affected must pay a direct subsidy to the transportation company. Otherwise the transportation company must make the service for such communities self-sustaining by charging a higher rate of fare than in the poorer but more populous districts. The latter alternative is not at all fanciful but is already a fact in Great Britain, where the motor-bus service introduced as the natural transport means for such districts tends to average a higher rate per mile than the service by car. In these cases, also, the flexibility of the graduated fare makes it possible to have an apparently like but actually different scale of fares through the simple expedient of giving shorter stages per penny via bus than via car.

Determine the Traffic Possibilities— Then Act Accordingly

THERE is a question as to how far an interurban railway can go profitably in attempting an intensive campaign of advertising and solicitation for new traffic. If the business being handled is a large proportion of the total available in the territory, there is little to be gained in such a campaign. But if the business handled is only a small part of the traffic moving between the points under consideration or originating within the territory served by the electric line, then there is room for development.

For example, the Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa, is handling 85 per cent of all traffic, freight and passenger, originating within and moving between the limits of its lines. With that condition, it would obviously be a waste of effort and money to undertake any special work to secure the other 15 per cent, a good deal of which is probably identified with the competitive railways in some way that would prevent any possibility of securing it for the electric line. On the other hand, the Chicago, North Shore & Milwaukee Railroad probably hauls not to exceed 25 per cent of the traffic moving between Milwaukee and Chicago, having a field of 75 per cent on which to work. With such a proportion of the business going over other lines and such splendid termini as Chicago and Milwaukee, the possibilities for securing more business are very real and one may easily justify a considerable advertising outlay and an intensive solicitation program.

These two examples are perhaps the two extremes. Few electric lines have the business of the territory served so completely in hand as the Iowa company, particularly in a case involving steam lines. And few lines have the possibilities in uncultivated business that the North Shore Line has, of which it is quite evidently not unmindful, considering the development work that is being done. By determining the total amount of business being handled by all the transportation agencies, then, once or twice a year, and taking into account the nature of the territory served, an interurban can arrive at a rough measure of how heavily it can afford to go into new traffic solicitation for the next year. The article on advertising and soliciting for traffic, elsewhere in this issue, will supply a few ideas on how new business can be secured. In general, it might be said that almost universally in the interurban field there could be a much more determined and resourceful, persistent and intensive solicitation to traffic than exists, with worth while results.

Basically Success in Selling Transportation Depends Upon Fundamental Principles of Salesmanship — Whether the Commodity Be Transportation, Merchandise or Personal Service, the Principles of Presentation Are the Same

Wanted—A Transportation Sales Manager

By William L. Goodwin

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SALESMANSHIP, definitely recognized by the inclusion of a sales manager as a leading executive of the railway organization, is, in a word, a suggestion which appears to me to offer the opportunity to railway executives today.

Perhaps I should explain why I, who am not an electric railway man, dare make such definite suggestions. In September, 1920, I received through J. G. Barry, manager railway department General Electric Company, Schenectady, an invitation from Harry Reid, president Interstate Public Service Company of Indianapolis, to address the fall meeting of the Central Electric Railway Association. My first reply contained this expression:

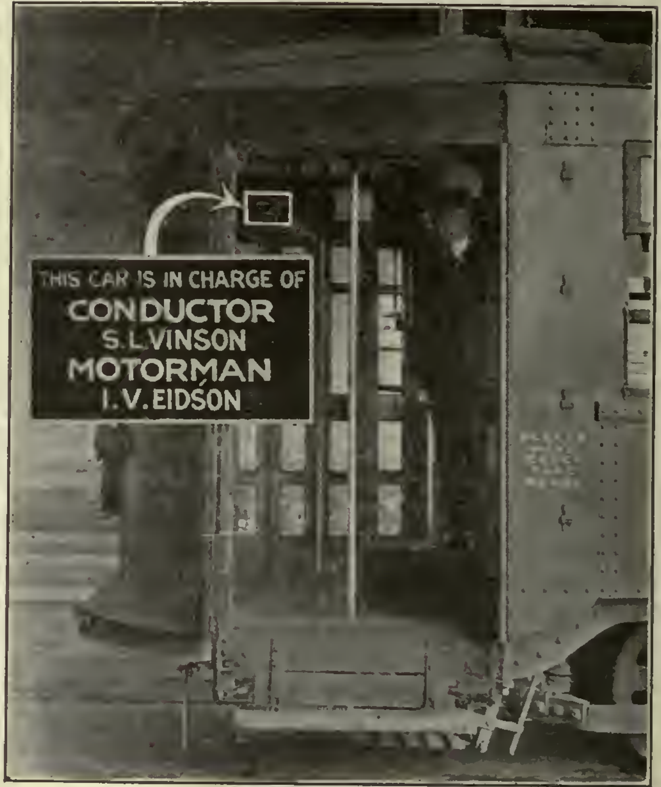
> As you perhaps realize, this street railway business is quite foreign to the work I have been undertaking. I have never attempted in any way to help the street railway industry because I know nothing about this highly specialized business—hence I hesitate to accept.

However, the message was transmitted to Mr. Reid; it brought forth a reply that the invitation stood, and I would be asked to talk on the subject of "Co-operation," with the qualification: "This is a broad subject, and Mr. Goodwin is at liberty to handle it in any way he may see fit."

Having no specialized knowledge of the street railway industry, but a background of some twenty years in practical selling and trade co-operation, I felt that this permitted broad latitude, and the invitation was accepted. The study which I made then, the talk I gave there, and the arguments which have ensued, have caused more study and analysis of the situation, from which I believe some useful conclusions may be drawn.

Not being dependent upon the electric railway industry for my livelihood I exercised the privilege of a frank expression in my Indianapolis talk. I wished there, as I wish now, that my ideas may be of value. Again when the Electric Railway Journal requested an article I felt that unless the privilege of free expression was granted no good would result. The privilege granted, let us hope that at least one idea will come to you from this effort.

My observation of the electric railway industry and the outstanding facts which present themselves to me can be summed up in the broad statement: "The industry is sick; far too many companies are in the hands of receivers, and the majority of the remainder are seeking havens of safety." And I think all will admit that the electric railway industry is sick, very sick, but it is not suffering from an incurable ailment. The illness is not one that could be singled out as a specific ailment. It is a complication of many ailments, which I will touch upon later. That the ailment is curable I am convinced; that the solution will be found is certain. It *must* be found, and found quickly.



The Ultimate Salesman on the Job and How He Is Introduced to the Patrons by the Georgia Railway & Power Company, Atlanta

But why mention specifically the one hundred and one ills of the electric railway industry? How to correct them is what we are concerned about. This naturally leads to the question: "Why should an American industry of such essential and important value to our citizenship be in this condition?" and the self-determined answer which I assign is "incompetent management." I use the term "incompetent" in the broad sense, since success or failure, when attributed to an industry or parts of an industry, in the last analysis, must reflect a debit or credit on the side of competent or incompetent management as reflected in dividends.

Over a long period of time, competent management reflects an ability to employ invested capital at a profitable return. Incompetent management indicates a lack of ability to employ capital continuously at a fair rate of return. Since the electric railway industry is not earning a proper return on the invested capital and since investment in the industry is frowned upon by experienced investors, responsibility for this condition must be placed in the management of the electric railway companies.

Volumes could be written upon the underlying reasons for failure, and the subject offers ample opportunity for our most experienced debaters, but summarizing all the causes and reducing them to a single statement I still believe that the electric railway industry is the only great American industry that has attempted to operate without a sales department. Here is the fundamental reason for the present condition of the electric railway companies of this country.

But right here is an opportunity. The very fact that the industry is in this condition should immediately suggest to the live executive the many ways in which the business cannot only be brought back to a normal state but can be made a very substantial and consistent profit earner.

Competition Must Be Met

Transportation is too important a part of civilization to be ignored. The public is going to have transportation and transportation which will gain its approval. Grumbling about the problems encountered and the competition met and offering alibis for inability to cope with the situation get one nowhere. The question is merely one of competition, and in time men will develop who are capable of meeting this situation and they will be the successful executives of the future. This is simply history repeating itself, but why wait for the development of another generation for relief? You, the present operatives of the electric railway companies, have the ability to meet the situation, if you will but take yourselves away from your problems long enough to get a picture of what is on the horizon. Let us assume that the business of transportation is sound, and its service is necessary and desirable. Then let us assume that the industry has found itself in its present state because of excessive competition. Do you recognize your present condition as the result of competition? The professional politician, the demagogue newspaper, an ignorant or indifferent public, regulation or restriction covering fares to be charged are all as real forms of competition as are the jitney, the walker, the stay-at-home and the pleasure automobile. In a broad sense let us recognize them as competition and let us compare this form of competitive restriction and regulation with what every other form of business has to contend with and then realize that your proposition is no more difficult than that of your successful associate in your community.

> PRACTICAL knowledge of operating problems in the electric railway industry has no value, in the final analysis, if it cannot be translated into dividend earning ability. Passing the buck of responsibility gets us nowhere. The time has come when you must produce dividends or step aside and allow others to do so.

Let us, for example, take some of the conditions in other branches of the electrical industry—the manufacturing, jobbing and retailing fields. Whatever their problems, invariably they are met by sales methods. You have the professional politician who is constantly criticising you for his personal advancement. The jobber and the contractor each have thousands of competitors who never tire of criticising them whenever they see an opportunity. You have the newspapers; they have the intensive advertising of the competitor, each contending superior merit for his products and superior service for his company. Ignorance and indifference are common to all industries, and in the sales of electrical products generally and also of electrical energy the public was, and to a large extent still is, totally ignorant of the real nature of the product. But by a constant high-pressure active sales effort individually and collectively they meet this ignorance and indifference and orders are secured. As against your regulation by the state or municipal bodies and the difficulties resulting therefrom, they have the Sherman law, the Clayton law, a monopoly or combination law in every state, inspection of their products, regulation of the methods of installation, bond laws, lien laws, and a dozen other restrictive measures which you have not and which do not discourage them in the least, nor cause them to attribute failure to these agencies.

There is one thing more which you have recently had a taste of, and which is a matter of common practice in other lines of business. I refer to competitors who are ignorant of cost and persist in selling their goods at ruinous prices. True, they fall by the wayside occasionally, but others spring up rapidly and the merry race goes on. The right sales arguments soon acquaint the purchaser with the facts. Goods are sold at a higher rate because the seller has established his good will. Value and dependable service offset the lower price. In your case you have the jitney offering for a nickel a ride that you know can not be produced at double the price. Is not your answer a selling proposition? If you can establish the fact that your commodity is worth what you ask for it and you have the confidence of your customers, they will buy your product in spite of a lower price and a poorer quality. But the burden of such work is on you. For a time you are going to have a very difficult job in convincing your customers, because, generally speaking, you do not enjoy their good will. Good will in business is nothing but a consistent and persistent repetition of the qualities of your product or service rendered. You have had the product and you have rendered the service, but you have failed persistently and consistently to keep the qualities of your product before your customers. If everybody in the community is damning street car service and you know it is good, why not tell them about it? But if you keep silent long enough, the fact has been established and sooner or later you are inclined to believe it yourself.

If you will analyze any of the large successful industrial corporations in this country you will readily discover that their principal executives possess real sales instincts. Presidents, vice-presidents and general managers are nothing more than a selection of the most competent sales minds in the institutions. Every problem in the final analysis is approached from a sales standpoint. Talk to any of the great legal minds, even, in our largest manufacturing companies, and you will recognize instantly a keen sense of sales instinct. Decisions affecting internal or external problems are always given with the interest of the customers ever in mind.

The law is very definite and specific. Sales departments are told what they can not do, but the sales instinct of the legal mind always suggests to the sales department what it can do as a way out. That is the effect of sales instinct in the legal mind. Does the counsel of an electric railway company advise his executives from this standpoint? If he does, then he has a legal mind with a sales instinct, but if his advice is always solely from the standpoint of the company and its rights and if he constantly urges on the executives the need of standing on their rights, then the decision is a legal one and the reaction on the industry is only what you now face.

In considering the problem of your industry, or in fact, any activity for profit, knowledge is of little or no value unless you can translate it into dividends commensurate with investment and risk. Industrially speaking, what is the value of knowledge of operating, engineering, financial problems, of the handling of men, of schedules, or any other subdivision of the business, if the operation does not produce profit? There is ample knowledge in the industry of operating problems —to apply this knowledge profitably is a selling job.

THE question of overcapitalization, that our professional politicians like so much to talk about, is incidental in relation to the failure.

The question of overcapitalization would in time have readjusted itself had proper sales effort been put forth.

Many, if not most, industrial enterprises are overcapitalized, and yet they are successful. The number of companies or corporations conducted upon a conservative capital basis is the exception rather than the rule, yet we can daily observe and record successes in spite of this overcapitalization.

The Transportation Commodity and Its Value

An electric railway company has a commodity to sell that is just as tangible as merchandise, be it either necessities or luxuries, just as tangible as banking service, just as tangible as professional service, engineering, medical or scientific, and just as tangible as the service of selling amusement.

In the electrical industry as a whole, the commodity is either electrical energy, transportation or commodities. Transportation and electrical energy represent intangible forms of service, principally because the "man in the street" has little or no opportunity of applying relative values. Whatever, then, the price charged, there is a natural tendency toward suspicion of an excessive charge.

From infancy we are taught relative values, and this simple, yet fundamental, principle of relativity stays with us throughout our life. But in service commodities, such as electrical energy and transportation, no such principles of value have been established. It is evident, therefore, that as a fundamental proposition, we are attempting to sell something of unknown value, "unknown" in the sense that we, of the industry, have failed to establish the value. Such intangible forms of service must be translated into relative values in order that the average mind may comprehend value received for money paid. To my mind, here we hit upon the fundamental fault in past and existing methods of selling such a commodity as transportation. In almost every line of human endeavor, measures of standard have been established, be it yardstick, the quart measure or the pound weight. The fact that in this particular case we are selling car rides makes no difference.

Here is another way of expressing it. Trade is founded upon the principle of the exchange of services for money. "Services" in the broad sense may be interpreted as the exchange of commodity or service, at a profit. You are selling street car transportation; I am buying it. Your success depends upon your ability to sell what you have to me at a profit and to make me satisfied with the sale. In this case we are talking of a car ride at a given figure. If I get the value for my money and don't know it, it is your fault. The burden of proof is always on the seller. Here, I think, the electric railway industry has failed to realize its responsibility.

Let us analyze service and see whether or not salesmanship is the foundation of success.

Everywhere we look and everywhere we turn, we see evidences of real selling effort to attract our attention to this or that commodity.

In the field of luxuries such as automobiles, musical instruments and home furnishings generally, proper salesmanship induces us to buy many times our requirements and at values greatly in excess of our ordinary needs.

Banking, which has to do purely with the producing of profit in the handling of money, has felt the necessity of employing the most modern methods of salesmanship, and every successful bank on this continent today features the value and character of the service it renders as a means for holding its present clients and acquiring new ones.

In the field of amusement the most intensive application of sales principles is involved. People have literally been brought to a condition of mind that they consider amusement almost a necessity.

Only in the professions do we find the lowest degree of scientific sales methods, and this is largely due to the fact that the professions long since established ethics which frowned upon salesmanship. But the professions are still in the classification of individual effort, and the compensation received by the average professional man is directly in proportion to the degree to which he applies or fails to apply sales ability.

The electric railway industry for one reason or another has failed to follow some of its early experiences of proved value. Very recently, consideration of the application of scientific principles of selling transportation has again been taken up. But nowhere do we find in the electric railway industry well-defined sales departments, headed by men with sales instinct.

In spite of this, there are many examples of excellent sales ability in the transportation business. Perhaps a discussion of some of these, coupled with an interpretation or discussion of what I mean by the more or less intangible and usually undefined term "salesmanship," may prove of interest. It may also help lead to my suggestion as to how the railway may organize for this sales effort.

Probably one of the most consistent examples of salesmanship in transportation is the case of the California Street Cable Railway of San Francisco. This company has constantly enjoyed the confidence of its patrons and the San Francisco public since the first wheel was turned. I cannot recall $1 that ever was spent for newspaper publicity, nor do I recall any specific case where publicity of any kind was used in the company's cars or elsewhere.

For many, many years I personally walked several additional blocks to ride on this railroad in spite of the fact that the time element of service from the given point to which I traveled was about five minutes longer than a more convenient electric road. But I, together with many thousands of others, had been sold as youngsters to the transportation of this railroad. I am now convinced that the directing genius of the road had a high sense of selling ability. The many, many courtesies which were daily evidenced by the gripmen and conductors on this railroad brought them close to the hearts of the people of San Francisco.

I cannot recall a single instance in which the question of time element in trips ever interfered with courtesy and convenience. Cars stopped in the middle of the block, or at the beck and will of the rider. I have actually seen these cars stop, both going up and down hills, on grades of from 10 to 15 per cent. These were always made in a courteous way, with evident pleasure to the car operators.

There were no signs on the cars "Do Not Talk to the Motorman." In light of the speed at which the cars traveled and the equipment provided for emergency stops, this was probably unnecessary, but the fact remains, nevertheless, that there was a feeling on the part of the car rider that, once boarded on a California Street Railway cable car, your safety was assured, and your comfort and pleasure was a consideration.

The old Sutter Street Railway of San Francisco was another typical example. Both of these roads were close and keen competitors; in fact, they operated on parallel streets three blocks apart. There is hardly anything that I could say about the California Street Railway that I could not say with equal emphasis about the Sutter Street Railway. In both cases the employees were of the highest intelligence; they remained in the service of the company for long periods of time; the equipment in both cases was maintained at the highest possible physical standpoint, and as I recall these bright, shining, clean, convenient modes of transportation, with equipment designed particularly to meet the needs of San Franciscans who delighted in riding on the outside, or open type car, I can again realize that here was an earnest effort to meet the need of customers by supplying equipment and service in conformity with their desires.

Probably the next nearest example that I may cite, even recognizing that there is a lapse of some thirty years between the time that the incidents have occurred, and which left such an impression upon me, is the modern day method of selling transportation as exemplified by the Fifth Avenue Coach Company. Any car rider in the metropolitan district of New York will realize instantly when boarding one of these coaches that the management as well as the operating personnel of the buses represents men of well-formed sales habits and ideas. The chauffeurs of these buses have a keen sense of human instinct, and can actually convey these buses through the most crowded section of New York, and can, almost with an uncanny instinct, select their customers waiting on street corners at a considerable distance before they approach them.

Here, again, the equipment is kept in the highest possible physical condition, and a rider on a Fifth Avenue coach cannot help but realize a feeling of company interest when patronizing these buses. And remember the slogan on each bus—"Civility."

On any bright Sunday it is impossible to secure seat accommodation; true, the buses and their routes lend themselves to such desires on the part of their patrons, but the fact remains that public prejudice against either the management, the equipment, or the security of transportation, any or all, would result in a public reaction that would make the bus a very undesirable conveyance.

> **STRANGE though it may seem, it is nevertheless a fact, invariably the less the competition, the less the success of the enterprise.**
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> **It would be interesting to acquire statistics to determine if it is not a fact that more failures have been recorded where exclusive privileges are granted than through any system of competition.**
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> **An exclusive privilege without proper regulation and direction stultifies initiative and causes us to assume such a self-satisfied attitude of mind that we become lazy to our responsibility and indifferent to our opportunity. After a time we commence to feel that we are serving by sufferance, and this underlying thought or principle has perhaps done more to injure the electric railway industry than any highly competitive system that ever might be encountered.**

And bear in mind that the fare on these buses, so long as my recollection goes back, has always been 10 cents, and there is no criticism, apparently, on this charge, in spite of the fact that buses are operated over routes established by the city in certain sections of the metropolitan district at one-half this fare.

The question of the cost of transportation after all is secondary to its value. My personal experience has been during the past four years that I actually seek a Fifth Avenue coach in preference to a Broadway surface car, in spite of the fact that the time element between my office and home is considerably less on the street car than it is on the coach. When we consider that the Fifth Avenue coach line is under the same management as the Interborough Subways and other transportation systems in metropolitan New York, the natural query is why this fine discrimination in service and the attitude of the people one toward another.

Apparently the operators of the Fifth Avenue Coach Company, including the motormen or chauffeurs and the conductors, realize they are in competition with other modes of transportation, and it is this realization of competition undoubtedly which reflects the character of the service rendered; in other words, salesmanship is the predominating, managing influence of the Coach Company and has been instilled into every one of the operators having to do with it.

Many similar cases could be cited.

Evidences of salesmanship in the steam railway field are too numerous to mention at length, but a few examples of early sales effort may suffice: the Santa Fé and its Harvey dining service, the Southern Pacific and its poppies, the Northern Pacific and its great big baked potato for 10 cents, the Milwaukee and its popular dining car conductors, the Canadian Pacific illustrated and descriptive time-tables and hotel system, the extra fare trains of many roads, where you are rebated upon failure of the company to make schedule, the amusement parks of most early ventures. These and many similar are all evidences of a lost art in selling transportation.

A comparison between the Fifth Avenue coach system with other methods of transportation in the metropolitan district does not reflect credit on the latter. Many, if not most, of the surface cars are poorly kept. The platform men are far separated from their patrons. Either the operating schedules are so fast or the rules of discipline so rigid that the platform men carry an expression of intense pain in the performance of their duties. Riding on surface cars in the metropolitan district has long ceased to be a pleasure; it is a painful duty which the patron must perform.

> QUESTIONS of publicity have a definite relationship to the product to be sold. Publicity as such has no value unless we have something to sell at a profit, and the product we offer for sale must have merit. It is useless to spend money for publicity in promoting a product without merit, and merit is of no value unless people can be made to understand it.

Of course no one rides in a subway for mere pleasure, but that is no reason why the journey should not be made pleasurable. It is difficult to keep the cars clean. The underground mileage operates against this, but does this justify trains being turned back at the end of runs littered with papers, dust and dirt which could easily be removed and would be removed if salesmanship were employed? In the entire subway operation, comfort and convenience have been made secondary to efficiency, and every car rider feels this the minute he enters a subway station.

VALUE OF THE SERVICE MUST BE DETERMINED

The great contest which is on at the present time between almost every electric railway company and its local community, between operating costs and fare income can be corrected by proper sales methods.

There are two ways to fix the price of transportation.

1. Fix the fare first, and then give as much (or as little) as that fare will buy. This has been the practice of the past, and broadly speaking, is the practice of today. It has resulted in failure. It does not employ or consider sales instinct or application.

2. Establish a standard of service and then fix the fare at a figure that will maintain this standard. Adjust the fare from time to time as standards of service and other factors change from time to time. This should be the 1921 model. It is based on scientific selling, salesmanship, sales instinct. Do not be misled.

You must establish a measure of transportation value. Whether you use a yardstick, a quart measure or a balance scale, the measure must be one which the public understands. Relatively speaking the electric railway companies offer more for the money than any other industry or business institution in the community, but they have failed utterly to acquaint their patrons with the character and value of the service rendered. The keen sales manager realizes this only too well. He will rapidly reach a common understanding of what the transportation company has to sell and how it shall be sold.

THE PUBLIC MUST BE "SOLD" ON THIS VALUE

American people with whom we must deal, even though the majority do not realize it, possess a keen subconscious realization of human psychology, know the value of commodities or service in relation to the purchasing power of the nickel, and will be quick to grasp the situation, once it is properly presented subconsciously. *They know* the value of an average car ride is worth more than a nickel, and what they are really doing is testing *your* selling ability.

Give them the facts in true selling form, and profit for your effort is assured.

They are not of socialistic tendencies, and Americans will pay for what they get, when they know the truth and value of transportation, and it's up to you, Mr. Street Railway Executive, to produce the goods.

Your business is selling transportation at a profit. Whether the fare be 5 or 10 cents is immaterial. It may be 5 cents in Pessimistdunk, 7 cents in Mediadunk, and 10 cents in Optimistdunk. The variables in each case will determine results, but the net return from the operation should be relative, all factors considered.

A RADICAL CHANGE OF POLICY NECESSARY

There are only two ways out—public ownership or change of policy. The first would be a national calamity; the second would be the salvation of the industry. Change of policy need not mean change of management. Increased fares are but temporary expediencies—with them must come an understanding on the part of the public of a measure of service and a recognition of a modified policy.

The electric railway company is looked upon as a corporation whose temperature is always below freezing. Raise its temperature by employing sales methods. As a matter of fact, it is and should be the most human thing in the community. Salesmanship in transportation means to sell more rides to more people and always at a profit.

One way not to do this is to post up too many directions for the car riders to absorb at one time. Well-worded regulations are necessary. But sometimes I see them given in such large doses that I am minded to ask how much does a patron have to learn and what antics does he have to go through in addition to paying his fare in order to get his ride.

Other conditions which should not exist are:

Men, equipment, schedules, tracks and the physical properties with the appearance of neglect. Street cars littered with indiscriminate advertising, from vague, patent medicines to other joy killers. Platform men.

improperly equipped from every angle to perform their duties. And the thousand and one other negative selling suggestions which are successfully destroying an otherwise profitable business.

MAKE YOUR COMMUNITY PROUD OF YOUR COMPANY

Talk about the city—about things along your right-of-way. Let the people know you are interested in civic affairs. People like to know about important industries. Talk about your receipts, your expenses, your fixed charges, cost of maintaining track, etc. Be liberal in transfer time privileges or eliminate them entirely. Public opinion is discernible; psychology plays an important part in molding favorable opinion. Favorable public opinion is an asset—it is difficult to acquire and when once possessed, guard it zealously.

You need the help of business men, you need the help of the whole community. Such appeals are always received in terms of reciprocity. If you want others to help you, you must be willing to help them.

The electric railway industry has held itself aloof, either from community co-operation or industrial co-operation. I have attended many conventions in the electrical industry. I have observed men from every other branch of the industry in attendance at your conventions, either for the purpose of selling their wares or acquiring information, but if you tabulated the attendance of all the electric railway men in the country at all the other trade conventions in the country, you would be ashamed to discuss the result. The sooner electric railway men recognize this principle and affiliate with other successful companies and organizations, the sooner will they acquire sales instinct.

Here is another job for the sales director or sales manager. Unquestionably more real information of value can be secured from an attendance at a convention representing commercial men than ever could be acquired by attending solely conventions of operating electric railway men. You must take yourself away from your own problem long enough to find out how the other fellow handles his problem.

You are breathing rarefied air; the atmosphere in which you live does not contain a sufficient amount of oxygen to keep you healthy. Think of business as you would a vacation. Get away from the daily grind of your business; go to the mountains or the seashore and get that relaxation and inspiration that enables you to take up your duties with renewed energy. In other words, mix with fellows in some other line of business, particularly in other divisions of the electrical business.

It is a great satisfaction to. read one's own writings, but after all, it is wise also to read what the other fellow writes.

WHAT IS SALESMANSHIP?

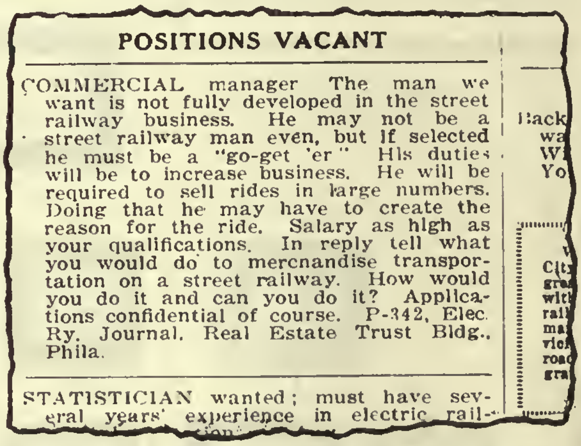
For any industrial operation to be successful, there must be in the institution a certain proportion of individuals blessed with what we clearly recognize as "sales instinct." The recorded instances of success without this sales instinct are so exceptional that it is difficult, if not impossible, to find them; at least a sufficient number to merit any consideration.

Sales instinct dictates, first, a knowledge of product; second, a knowledge of policy, and third, the right thing to say at the right time. The skilled salesman comes home with the order, and a profit results from the transaction. Industrially, we are a nation of skilled salesmen. Once we instill in the electric railway industry this necessary fundamental instinct, we will have started on our journey toward success.

Sales instinct may be likened to psychology; no two men employ the identical method in similar cases. The personal equation always enters. Did any one with a knowledge of selling ever hear of a standardized, standard package, capsule form of sales argument? Did any salesman ever formulate his sales argument and then, when admitted to the office of the executive or purchasing agent, ever carry out an argument so formulated?

On the contrary, the number of failures in industry which have been recorded through a lack of sales instinct are so numerous, and can be so definitely proved, that one hesitates almost to think about it.

Sales ability recognizes competition, no matter in what form it appears; it will be merely a matter of every-day routine. Analyze, if you will, the personnel of our most successful industrial corporations, confine your analysis further to the electrical industry, and you will find the men at the head of these institutions, and those all the way down the line in charge of operations, to be men of sales instinct, call them executives, managers, or what not.


POSITIONS VACANT

COMMERCIAL manager The man we want is not fully developed in the street railway business. He may not be a street railway man even, but if selected he must be a "go-get 'er" His duties will be to increase business. He will be required to sell rides in large numbers. Doing that he may have to create the reason for the ride. Salary as high as your qualifications. In reply tell what you would do to mercnandise transportation on a street railway. How would you do it and can you do it? Applications confidential of course. P-342, Elec. Ry. Journal, Real Estate Trust Bldg., Phila.

STATISTICIAN wanted; must have several years' experience in electric rail-

Somebody Is Apparently Waking Up! This Advertisement Appeared in the Sept. 17 Issue of ELECTRIC RAILWAY JOURNAL

If they are successful, they possess sales instinct, otherwise they are soon relegated to the scrap heap of routine positions.

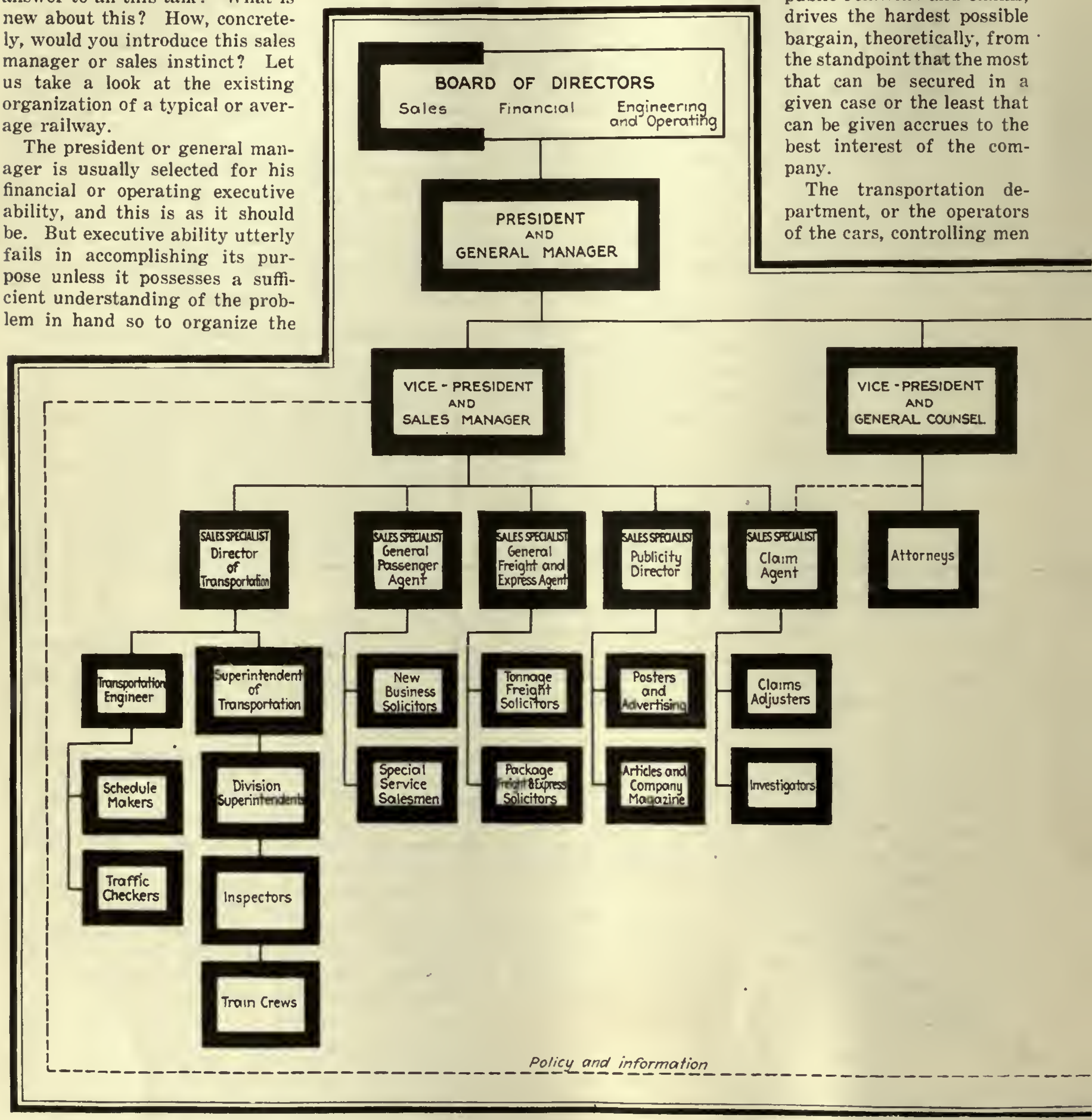
It is recognized, and undoubtedly is a fact, that the less competition, the less the opportunity for success. The principal trouble with the electric railway company, it has not had real, severe competition, in the usual recognizable form. Hence it has not felt the necessity of developing sales methods and employing sales instinct to meet its competition. It has viewed its problem from an operating basis, and operators, as such, do not recognize their competition when they see it. Hence, they do not know how to combat it.

Why talk about competition? The electric railway company has no competition in the broad sense, except the competition which it creates itself. What an opportunity for a real salesman! The only company in the community, with the whole community as a prospect twice every day! Boards of councilmen, politicians, and demagogue newspapers should be easy prey for the real salesman. There is a constant attempt to justify failure on the form of competition encountered. A successful salesman has no alibis to offer. A lost order is of passing moment in his career. He seeks new fields, new prospects, and builds new customers.

The stay-at-home, the walker, the jitney, the bicycle rider is the lost customer. He will be lost until he is brought back with renewed effort, founded on right selling.

You very properly are asking by now, "What is the answer to all this talk? What is new about this? How, concretely, would you introduce this sales manager or sales instinct? Let us take a look at the existing organization of a typical or average railway.

The president or general manager is usually selected for his financial or operating executive ability, and this is as it should be. But executive ability utterly fails in accomplishing its purpose unless it possesses a sufficient understanding of the problem in hand so to organize the company or institution that the business can be operated at a profit.


BOARD OF DIRECTORS
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PRESIDENT AND GENERAL MANAGER
VICE-PRESIDENT AND SALES MANAGER
VICE-PRESIDENT AND GENERAL COUNSEL
SALES SPECIALIST Director of Transportation
SALES SPECIALIST General Passenger Agent
SALES SPECIALIST General Freight and Express Agent
SALES SPECIALIST Publicity Director
SALES SPECIALIST Claim Agent
Attorneys
Transportation Engineer
Superintendent of Transportation
Schedule Makers
Traffic Checkers
Division Superintendents
Inspectors
Train Crews
New Business Solicitors
Special Service Salesmen
Tonnage Freight Solicitors
Package Freight & Express Solicitors
Posters and Advertising
Articles and Company Magazine
Claims Adjusters
Investigators
Policy and information

A Suggested Organization for an Electric Railway

Merchandising transportation, which is probably an appropriate expression to cover the broad field, means selling transportation at a profit. But we cannot undertake a merchandising proposition without sales management or sales direction.

But what do we find? We find that the president or general manager has set up a number of sub-departments which we call "legal," "transportation," "power and overhead," "equipment," "way," and "accounting." Now let us analyze these departments from the standpoint of the personnel in charge.

The legal department, in the matter of franchises, public relations and claims, drives the hardest possible bargain, theoretically, from the standpoint that the most that can be secured in a given case or the least that can be given accrues to the best interest of the company.

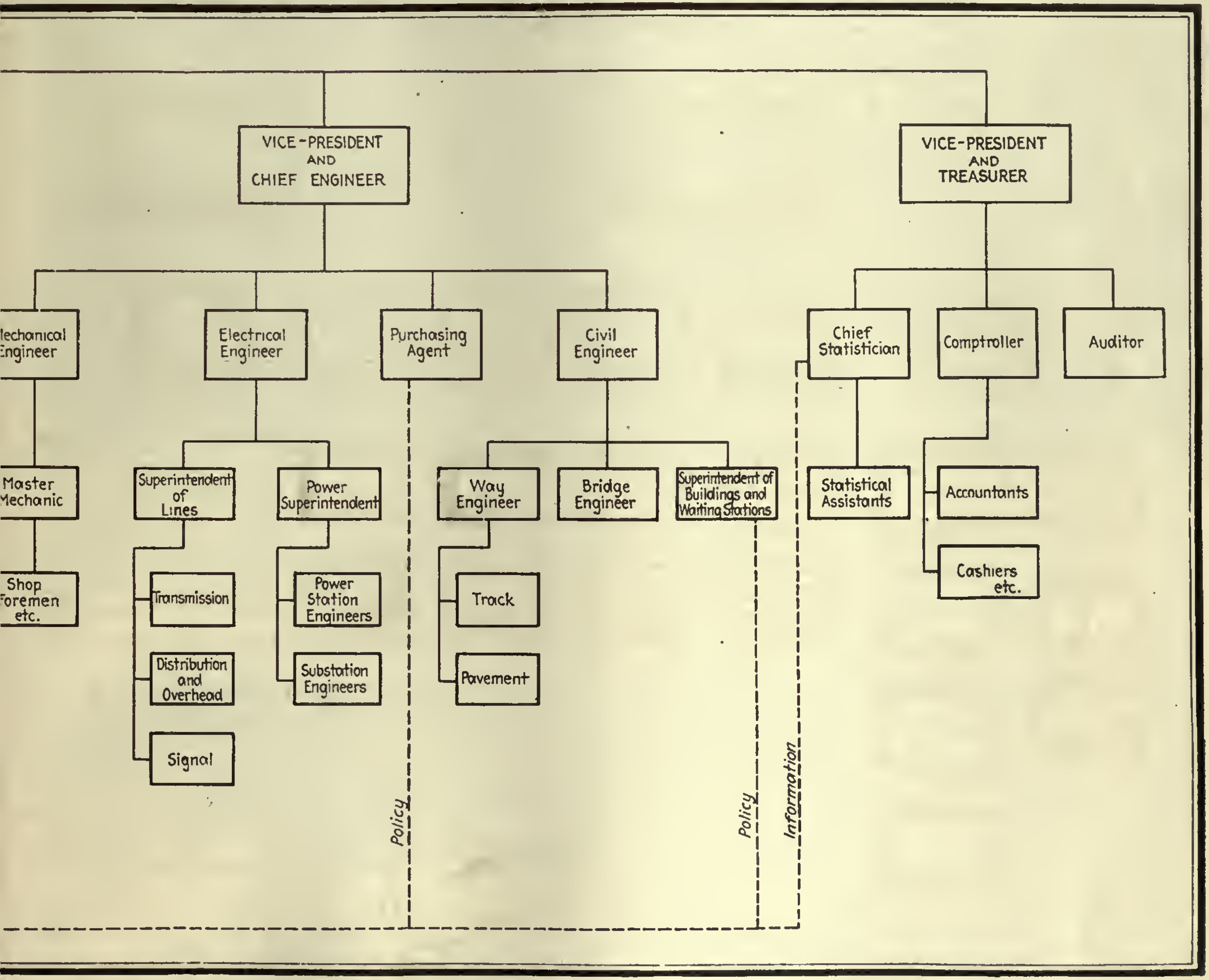
The transportation department, or the operators of the cars, controlling men and runs, approaches the problem from the standpoint that the man-power operating the cars has the same relation to the physical operation of the road as the motor under the car. Platform men are really individual salesmen of the transportation company, but they are trained as car operators and not as individual salesmen. The successful platform man should be selected upon his ability to cultivate good will of his patrons and to cause them to enjoy street car riding. A five-minute discussion with the average motorman or conductor will convince you that the motorman is primarily interested in getting his car over the ground and the average conductor is so involved in collecting fares and keeping time schedules that courtesy to patrons is of secondary moment.

The fault is probably due to the system under which the men are employed; they are employed as car operators and not as company salesmen.

Next let us consider the schedule makers in this department. They are charged primarily with the problem of dealing in loads and schedules. The pleasure they derive from their work is their ability to keep cars loaded to maximum capacity and schedules based on maximum efficiency. At the slightest sign of a slackening of traffic, schedules are reduced, and in multiple-car equipment cars are taken off. The result of this condition is obvious to all—it ceases to become a pleasure to ride during the busy hours because of the overcrowded condition of the cars, and during the slack hours because car schedules are so designed that the average patron is so annoyed in waiting for cars that he is in an unpleasant frame of mind when he enters the car and drops his nickel into the conductor's fare box.

It is not necessary here to review the conditions in other departments of operation—power and overhead, equipment, way and accounting. These divisions of electric railway operation are so intangible to the average layman or passenger that we can easily group them under a general department of operating and providing the character of equipment and service essential to success.

This does not minimize the necessity of their recognizing their relation to the final sale. They do not come in direct contact with the sale, which is the point now in mind.



mploy the Principle of Salesmanship in Transportation

Recognizing that the present condition is one of long standing and will take a considerable time to correct, you should first start by a general reorganization of your internal affairs and put your house in order. Let us maintain your present executive head under the title of president and general manager. Now let us set up those departments necessary to present your service, with intelligent salesmanship as a foundation.

I have prepared, with the co-operation of the ELECTRIC RAILWAY JOURNAL editors, a chart which embodies my ideas of an organization based on this sales idea. It is only a sample chart and is not intended to be complete or all inclusive. But it does point out where I think salesmen should be. Each of the heavily bordered blocks represents a man chosen for his "sales instinct."

We will have first a sales department, then a legal department, then an engineering department and last a financial department. Each of these departments will be in charge of a vice-president—the senior vice-president in charge of the sales department, and next in order legal, engineering and financial. The chart herewith in the main would outline an organization of such departments with additions or subtractions dependent upon individual cases.

I think the idea which I wish to convey is largely evident on the chart itself. The sales department is charged with selling transportation at a profit. It is responsible for all relations with customers (the riding public), it is charged with relations with the general public. The man at the head of this department must be a man who first, last and all the time is a salesman. All other qualifications are secondary to it.

The sub-departments of the sales department must also be manned by men whose outstanding quality is sales instinct. They must naturally have ability to organize and handle their departments. The director of transportation, for example, must be a man with ability to organize and direct human energy. He must be able to fraternize with his men, and from his own sales ability and sales spirit to inculcate in them the ability to handle in a satisfactory way the patrons of the company. Under such organization and direction, platform men become the individual salesmen. On them rests largely the ability to maintain proper relations with customers.

The transportation engineer, too, as well as the superintendent of transportation, must be a salesman. He must approach his problems not only from the standpoint of efficient operation, but also to satisfy the needs of the community; in fact, the latter is his principal job. Time schedules, while essential to successful operation, should not be permitted to interfere with the convenience and comfort of patrons. They should be fitted to that convenience.

The transportation department is not the only subsales department. Certainly the passenger agent and the freight and express agent, with their forces, must be the very essence of salesmanship. The publicity director must recognize that advertising is only a piece of salesmanship. There is precedent enough in successful utility companies for placing the claims department in the sales department to justify that suggestion here. We must keep in mind that it is salesmanship of the broadest order that we are talking about, and not merely stimulation of a few more car rides. The claim agent is in a most advantageous position to exercise real sales ability.

It may be wondered at that I insist that the general counsel be as much of a salesman as the sales manager, but I think that earlier in this paper I have indicated the relation of the legal adviser to the sales policy of the company. Certainly some of the greatest salesmen in the industrial field today are the principal legal vice-presidents. On the other hand, some of the greatest hindrances to successful sales efforts on the part of whole organizations are attorneys who judge or predicate their actions on technicalities rather than on sales instinct.

While not advisable to place them in the sales department, I have provided connection between both the superintendent of waiting stations and the purchasing agent to the sales manager for contact on the question of policy. The reasons, I believe, are very evident. And that there should be a very close relationship between the statistical department and the sales manager is axiomatic. The statistician should certainly be governed by sales direction. It is through him that the sales manager acquires information regarding those more tangible forms of competition, such as the stay-at-home, the walker, the private automobile (with its increasingly helpful hand to passers-by), the taxicab, the jitney and the bicycle.

I repeat that the organization indicated in this diagram is but a suggestion which I am using as a graphic picture to indicate what I mean by the importance of placing men with sales instinct in railway organizations as an answer to what to do in order to institute the radical change of business policy which the industry really needs.

I have no thought that the personnel of the electric railway should immediately be transformed to conform with the ideas here suggested, but a step might be taken at once; viz., those executives and others indicated in the diagram as essentially sales positions might well take a course in salesmanship; they might devote a part of their time to an extensive study of selling, salesmanship, sales psychology, and sales instinct.

Whether these qualities are natural or acquired makes no difference. For the present, a school in salesmanship could be started in each company, and it would probably be astonishing to realize how quickly the men would respond to the ideal. As new men are hired, particular emphasis should be given to sales instinct.

As to how the men would be rewarded, either in compensation or other ways, for their particular selling ability, is a matter that would not necessarily lend itself to any standardized practice. Each sales executive would determine from the broad principles involved the best practice to apply in his particular case. If the right man is selected as the vice-president and sales manager, or such other title as may be most appropriate to his position, his sales instinct will soon be reflected throughout the organization, and the existing counsel, president and general manager, and all others will sooner or later acquire a broad conception of the fundamental principles and policies involved, and the reaction throughout the organization will be speedy and profitable.

But the trainmen are the salesmen, and they should be employed, first, for their sales ability. The sales executive with real sales instinct, having his finger on every vibration of the entire system, will know the right thing to say at the right time, will outline for the advertising department the broad ideas to be expressed, and the advertising department will translate these ideas or expressions into appropriate language for public consumption.

But the printed word must be backed up by performance, and performance to the car rider is what he sees and feels and absorbs by instinct, psychology, or whatever else you chance to call it, and he will not be fooled by any clever expression, beautiful pictures or other appeals not supported by a mental and physical realization of a modified policy in service.

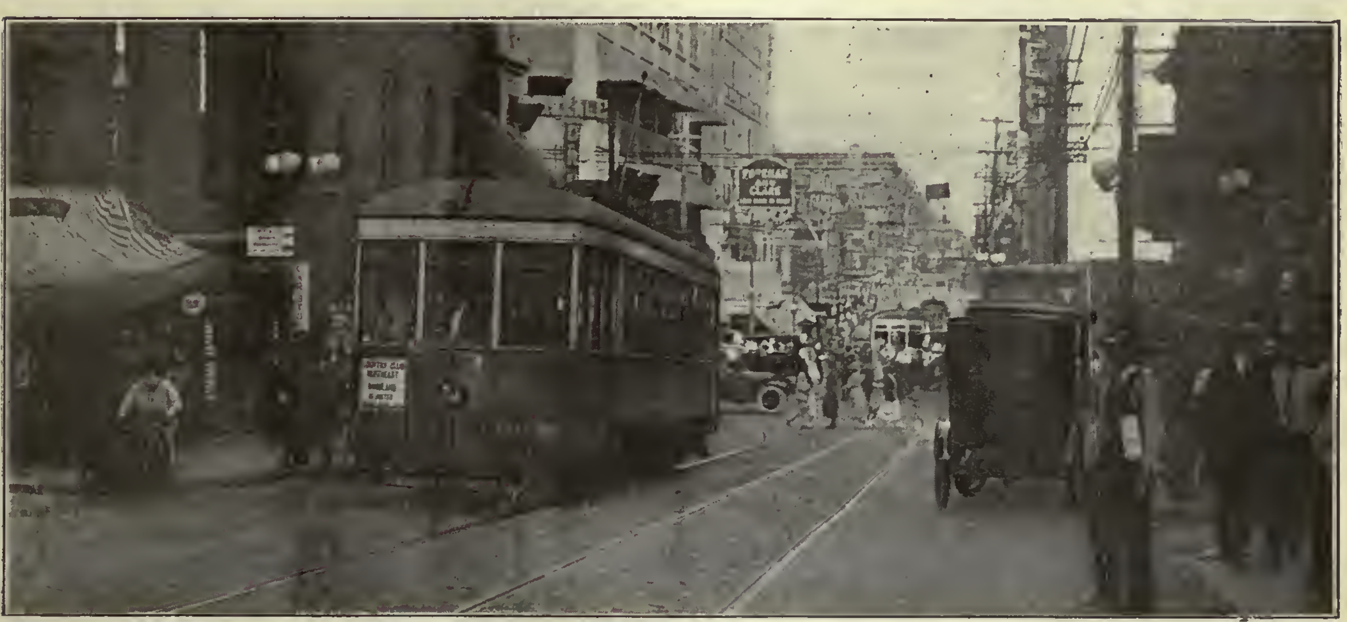
A sales manager is not a panacea for your every ill—the professional politician, the demagogue newspaper and the ignorant or indifferent public will always be with you—these are merely forms of competition—recognize them as competition and combat them by proper sales methods. That is the job of your sales manager.

Some Operating Economies Made Possible by Increased Schedule Speed, Better Distribution of Service and Rerouting—Obtaining the Most in Service and Earnings from Car-Hour Expenditures

Greater Operating Efficiency Enables Better Merchandising of the Service

By F. G. Buffe

General Manager for the Receivers the Kansas City (Mo.) Railways



Corner of Main and Twelfth Streets, Kansas City, Mo., at 5 p.m.

A westbound car is shown stopping in the berth just west of Main Street. At the right of the picture is seen a front-end collector wearing the new portable farebox waiting for a car to pull into this eastbound double berth. Two cars have just left this stop and have crossed Main Street and are proceeding across Walnut Street to the double-berth stop between Walnut and Grand, skipping both Main and Walnut. The traffic officer is allowing north and south bound traffic to proceed after he has passed the east and west-bound cars across the intersection. The double-berthing signs are shown at the left of the west-bound car. Seven cars are in sight, as the headway at this point at 5 p.m. is forty-five seconds in the maximum direction.

A PLANT manufacturing transportation reckons the expense of production in car-hours. Every sixty minutes of measured time means a money outlay for platform wages, power, maintenance and the other expenses which go up and down with this extremely busy little unit of measurement. At least 60 per cent of an electric railway's maintenance and operating cost varies directly with the number of car-hours operated. Therefore, one of the greatest, if not the greatest field for making major economies lies in utilizing car-hours so that the public and the company receive from them as nearly as possible 100 per cent efficiency. Cars standing in congested districts waiting to get through bottle necks; cars consuming too much time loading and unloading; cars not getting through heavy traffic points on schedule time; cars routed so as to provide excess and duplicate service are all expense producers and revenue reducers. Such cars are not only depriving the public of service, but are increasing the company's operating expenses, making higher fares necessary and detracting from the quality of the product which the plant is turning out to sell.

Many crimes are committed in the name of economy, and very often methods are employed for this purpose which when analyzed not only fail of the result expected but actually entail added expense either through increased overhead cost or lack of efficiency in some other direction. There have been bonus systems instituted which only resulted in increasing wages under another name. The library of perhaps every company in the country contains handsomely-bound copies of elaborate efficiency reports upon one phase or another of its business, prepared at large expense, which could not today be located were it not for a good cross index filing system. One useless car, useless either because of congestion or poor routing, operating eighteen hours a day, 365 days a year, will eat up $12,000 in wages, power and other direct costs.

The best merchandising transportation advertisement, after all, is service, and without it all the advertisements and all the propaganda in the world will not convince the car-riding public that it is getting what it should get for the increased fare it has been made to pay. In practically every fare increase in the country the public has countered by demanding service, and that town in which there is the least complaint over fares is the one in which the street car company is furnishing the public the maximum in car service.

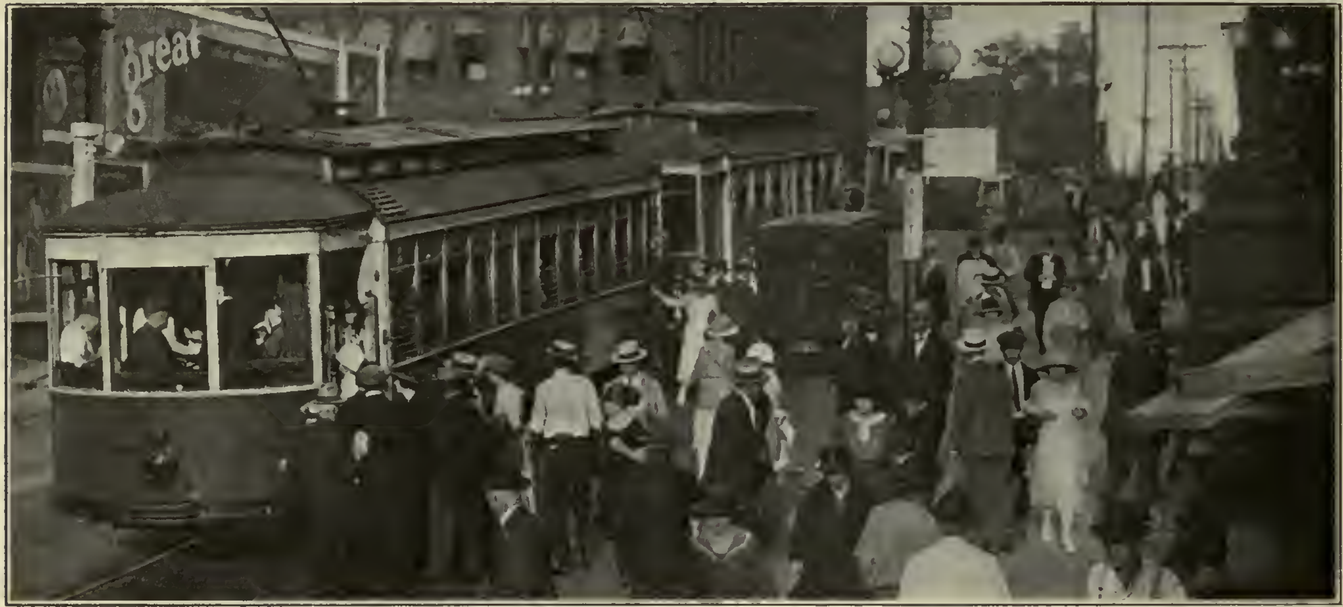
In Kansas City we found that our biggest field for improving service and effecting operating economies that counted was in the better arrangement of our car-hours and getting more out of them than we had before. After doing all the minor things that could be worked out we reached the conclusion that drastic and radical measures would have to be adopted to give the public the best our facilities afforded and to effect economies which were imperative.

Due to the topography of Kansas City, and especially the severe conditions in the retail district, operation of an electric railway system is, to say the least, extremely difficult. The retail business and office buildings of the city are concentrated within a comparatively small area, six blocks north and south and five east and west. In the maximum rush hour, through the intersections within this area 5,000 car movements were formerly made, of which an astonishingly large proportion were left-hand turns. Extremely narrow and congested streets further aggravated the situation. To make matters worse, because of the topography of the district only two east and west lines were possible. In addition to the car movements, there were at the same time more than 400 jitneys plying their trade in this district and a good proportion of the 40,000 automobiles owned by Kansas City's 350,000 citizens. The absence of parking restrictions converted the narrow streets into outdoor garages, so that it was impossible for vehicular traffic to pass between car tracks and parked automobiles.

This situation became so bad that in December, 1919, we showed speeds as low as 0.8 m.p.h. through two blocks representing the point of maximum congestion. This condition would exist for fully fifteen-minute periods. During the rush hour the average speed of street cars and vehicular traffic was reduced practically to a walk. All principal intersections were choked with traffic. At one corner 243 cars were scheduled through an intersection during the hour between 5 and 6 in the evening. These cars were provided and dispatched, but only 190 were able to get through due to the fact that the intersection was plugged for practically the entire time either by cars or vehicles, and as a consequence the public was deprived of fifty-three cars when most needed although the company had provided them and was paying the car-hour expense they entailed.

The services of John A. Beeler and his staff were enlisted, and together with our own transportation department force, more than a year was spent working out this problem. Recommendations were made from month to month and changes were gradually instituted in which public officials gave good co-operation. The measures for relief which were adopted and which are now in effect are principally as follows:

Car stops were relocated and combined, making what is practically a skip-stop system in the business district.



Double-Berth Stop on Eighth Street Near Grand Between Grand and Walnut

The severe grade on which the cars must stop and the narrow street make this one of the most difficult operating points. At this intersection 243 cars pass between 5 and 6 p.m., and at Eighth and Walnut Streets, 258 pass during the hour. A car stop sign and an information sign just above are seen at the right of the illustration.

Cars on the two heavy east and west streets were made to clear in one movement the heaviest intersections and to stop at designated points regardless of corners.

Double berthing was arranged at all downtown stops.

Traffic officers were instructed to pass cars across intersections in pairs and simultaneously in opposite directions whenever possible.

Automobile parking restrictions were put into effect during rush hours.

Additional street collectors were employed so as to facilitate loading and unloading, and to see that the doors are closed promptly as soon as proper loads are on the cars.

Cars were made to stop but once at each passenger stopping point and proceed after the doors are once closed.

These and other minor remedies upon adoption produced the most gratifying results. They have now been in effect for more than a year and a half. In the direction of heavy travel during the evening rush hour on five principal streets in the business district the average increase in the number of cars passed is 30 per cent and the average speed of cars has been increased 42 per cent. In other words, the car rider is now receiving 30 per cent more service at the right time and is being carried out of the congested district 42 per cent faster than formerly.

Because these "bottle-necks" were opened so that scheduled cars are enabled to pass through on schedule time, headways are regular, delays due to congestion are practically eliminated and the entire system moves easily and without confusion. As a result, several hundred car-hours per day were saved in cars sent from the carhouses to fill spaces formerly caused by the inability of scheduled cars to get through the congested district. Every car-hour paid for was available for public use and returned its correct proportion of revenue. The public talked of increased service, when as a matter of fact the company had not increased the number of cars dispatched but had only made it possible to put its transportation service at the disposal of the public when and where it was needed.

The system average schedule speed has increased from 8.8 m.p.h. to 9.3, an increase of more than 5½ per cent. The resulting economies and better service can be easily computed.

MAJOR REROUTING DIFFICULT BUT EFFECTIVE

The next strenuous problem attacked was that of rerouting the lines. This was an extremely difficult task and required not only careful and conscientious work to reach the best solution, but extremely diplomatic handling in order to secure permission of the city authorities. To change routes of years standing is a radical move, and is immediately met by the resistance of business interests which feel that they will suffer a loss with the change of routing.

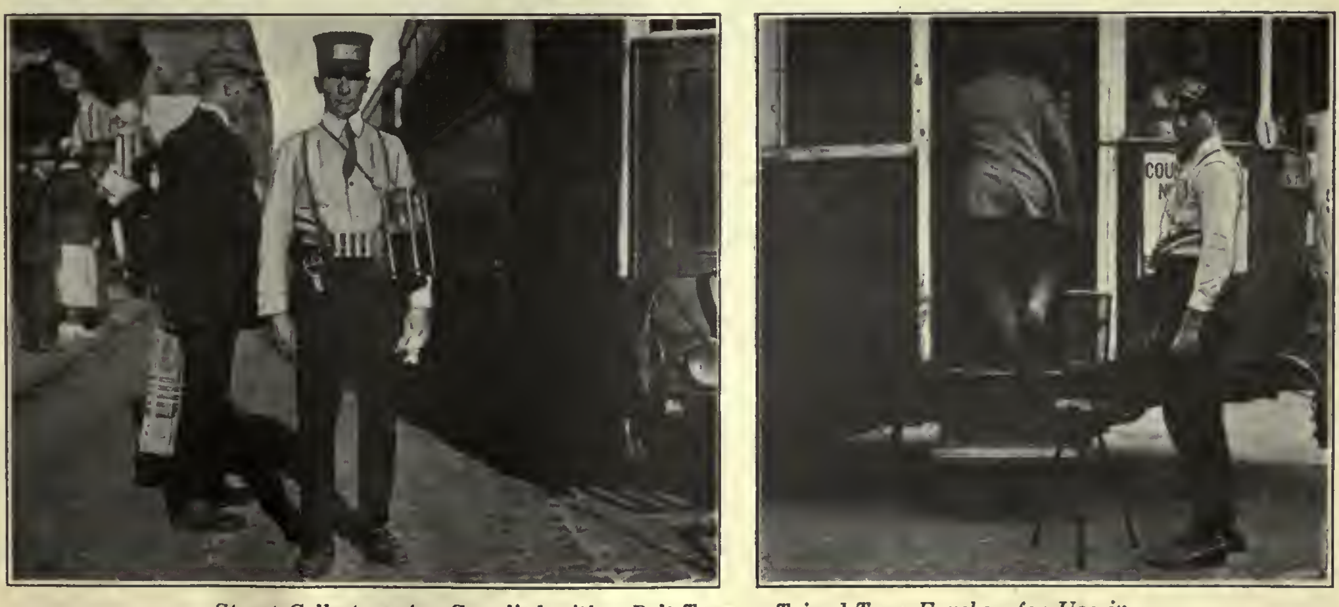
However, the plan recommended by Mr. Beeler, with a number of modifications, described on page 957, Volume 56, ELECTRIC RAILWAY JOURNAL, was finally adopted by the City Council and much of it has been put into effect. Changes have been made very gradually, one line at a time, so as to avoid inconvenience to the public, and to date, although some of the largest and heaviest lines have been changed, there has been no complaint but, instead, universal commendation.

Dispatcher's Booth and Attendant at a Busy Corner, Motorcycle Inspector and Uniformed Inspector

Unfortunately, it was not possible to put Mr. Beeler's report into effect in its entirety, and certain changes insisted upon by public authority have reduced the estimated savings which were inherent in the plan. Nevertheless, the fact remains that for the first six months of this year there has been saved in platform labor and power an average of $22,000 per month, and in July, due to added rerouting under the ordinance, this saving was increased to $31,000.

The Kansas rerouting is still being discussed by the city authorities of Kansas City, Kan., and the receivers, and should permission be given to install the plan proposed, which is a modification of that outlined by Mr. Beeler, it will mean an additional saving of approximately $8,500 a month.

The rerouting has resulted in a 20 per cent decrease in intersection car movements in the downtown district, has eliminated left-hand turns to a large extent, and has consequently increased the ease and rapidity with which cars are moved. The economies from the rerouting arise from the absence of duplication and the fact that cars are kept moving throughout the length of their routes over producing territory. All downtown loops and dead mileage have been eliminated wherever possible.



Street Collectors Are Supplied with a Belt-Type or Tripod-Type Farebox for Use in Front-End Collection in Congested Districts

Routes have been concentrated also so as to keep pace with the business growth and development of the city, and service has been correspondingly regulated.

RECEIVERS GO THE LIMIT ON SERVICE

Coincident with the appointment of Senator Francis M. Wilson and Colonel Fred W. Fleming as receivers in October of last year, a decided increase in service was inaugurated. Jitney competition was then at its maximum, 400 jitneys daily carrying an average of from 40,000 to 50,000 passengers. The receivers, although previously acquainted with the street railway business other than as passengers, decided that the only limit to car service in Kansas City would be cars and facilities. The Board of Control's rush-hour standard of 4 sq.ft. per passenger and a non-rush standard of a seat per passenger was discarded and service exceeding this placed on all lines. Therefore a large part of the savings effected through rerouting and other car-hour economies have been used in giving Kansas City without question the finest street railway service it has ever enjoyed, and as far as I know the equal of any being furnished anywhere in the country today. It certainly is, as measured by any comparative loading and service standards authorized by commissions.

An Excessive Street Railway Valuation

Not only on the showing made by Colonel Fred W. Fleming for the receivers of the Kansas City Railways Company, but on the basis of common knowledge as well, the assessed valuation of the railways property recommended by the Missouri tax commission is excessive.

There was a time when the company had a substantial investment value and a rosy speculative value. That time is long past. The speculative value faded under the stress of war conditions. It carried a large share of the real investment value with it.

With the company hopelessly bankrupt, the old valuation figures became meaningless. The *Star* doesn't pretend to know what the property would bring at a sale. But with the company's present prospects, with the competition of the automobile and with the necessity of a high fare that prevents what might be considered a normal expansion of business, it feels confident that the system would bring nothing like the $19,000,000 valuation recommended by the tax commission. Moreover, other property in Jackson County is on a 50 per cent valuation, so the street railway is heavily penalized in being assessed at what is supposed to be a 100 per cent valuation, but which is much more than that.

This newspaper is not concerned with saving tax money for the owners of the property. It is concerned that the street car riders shall not be burdened with hundreds of thousands of dollars of taxes beyond what are fairly due. Under the present circumstances every dollar of excessive taxes means skimping the service or maintaining a burdensome rate of fare, or both.

In the interest of the development of Kansas City, which needs cheaper and more adequate street railway service, the *Star* hopes the board of equalization will see its way clear to make the street railway assessment nearer in line with the existing actual valuation.

Editorial Comment from the Kansas City "Star"

At the time service was so increased other economies in the transportation department were inaugurated as rapidly as possible, many of which had been put into effect prior to the receivership, and the results of which were utilized to give this greatly enhanced service. These are more or less familiar to every one, including, wherever possible, turn-back schedules so as to keep the maximum number of cars in the districts of maximum population and travel. In other words, an effort was made so to arrange schedules as to give zone service where it could possibly be done. This resulted not only in economies in schedules, but in maintaining headways to correspond with the traffic density of the various sections of the city, and not to run expensive car-hours where they were not needed.

Safety cars, of which this company operates 100, were adopted as early as April, 1919. At the present time approximately 20 per cent of the daily car-hours are safety car-hours. Allowing for 40 per cent decrease in headways and a corresponding increase in service, this means a direct daily saving of $400 under the amount it would require with the larger units.

Labor turn-over has been reduced to the lowest in the history of the company. In August it was less than 2 per cent. This, coupled with intensive instruction and the easier and less congested movement of cars through the business district, has resulted in a 24 per cent decrease in all classes of accidents for the first six months of this year as compared with the first six of last year.

The reduction in the number of transfers as a result of the rerouting is another important effect. The necessity for transferring has been reduced at least 25 per cent with the routes already changed, and studies show that with the entire rerouting in, the 150,000 daily transfers should be reduced to not to exceed 100,000.

Today 690 maximum rush-hour cars are being operated as against 640 a year ago. Car-hours have been increased from 7,400 to 7,900 a day with a corresponding increase of 4,600 car-miles. When it is considered that every car is getting through congested points on schedule time, that turnbacks on all principal lines are returning cars to the business district when needed, and that combination of routes has eliminated downtown loops and service duplications, it can easily be seen that the actual increase of service to the public is much greater than as represented by the actual increase in the number of hours operated. Kansas City is today receiving at least a 30 per cent better street railway service as service is measured by loading standards, headways, car availability and speed than it did prior to the changes related.

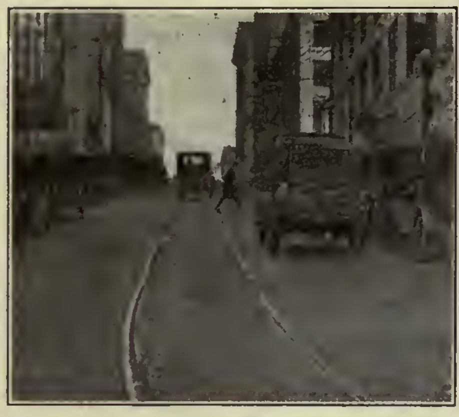
IMPROVED SERVICE HAS WON PUBLIC FAVOR

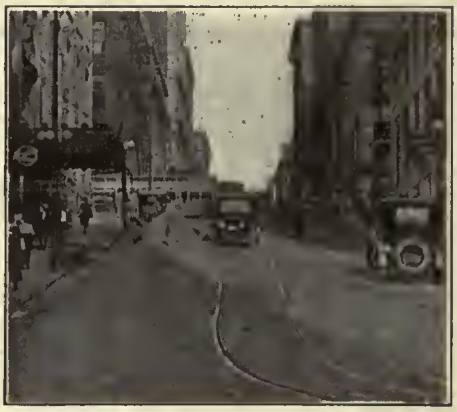
Without one line of advertising or publicity of any kind this transportation service is merchandising itself. The receivers have made plain to Kansas City that notwithstanding that every possible economy has been and will continue to be made, it will not be in those directions that will curtail car service. As a result of this continued policy there has been a most astonishing reversal in public opinion in Kansas City. This is perhaps well illustrated by the change in attitude of the Kansas City *Star*, as shown by the accompanying editorial quoted from the *Star*, which has always been very antagonistic to the company. Although the receivership is not yet a year old, jitney competition has practically been eliminated almost entirely through the force of public opinion. The number of jitneys has been reduced from 400 to 130, and through ordinances recently passed these are now operating illegally and unless legal complications arise they should disappear from the streets entirely within another thirty days. The first ordinance was one prohibiting jitneys on car track streets. The next ordinance required them to secure the consent of 51 per cent of the property frontage from property owners on all residence streets upon which they operated. They failed to do this on every route and have been ordered off the streets of the city.

Contrary to most cities during the past three months of extreme industrial depression, the number of passengers has not decreased under those carried a year ago, but has shown about a 3 per cent increase. The public and the press are both keenly alive to the policy of the receivers and there has been in Kansas City no agitation for a decreased fare.

The receivers' policy has been better to merchandise their product, not through maintaining the selling price and reducing the cost, but in return for the fare paid to reduce the operating cost and give back to the public part of the saving in increased comfort and increased service. It has been a far-sighted policy of reconstruction not influenced by loading standards, slide rule calculations or false economies. The policy is well summed up in the statement of one of the receivers in giving his orders to the operating department:

"I don't care anything about hearing of 4 sq.ft. of space per passenger or speaking of human beings as if they were articles of merchandise. I have ridden street cars for years, am a strap hanger and a seat rusher by nature, and common sense teaches me what square service to the public means. Our first job is to show the people of Kansas City that it is the duty of a public service corporation to serve the public, and whenever it ceases to do this the very name is a fraud practised upon the people and it ought to take in its sign and quit business. Our job is to please the people who ride our cars, and within a reasonable limit, wherever legitimate requests are made, they will be complied with or good, sufficient and satisfactory reasons given why they cannot be."

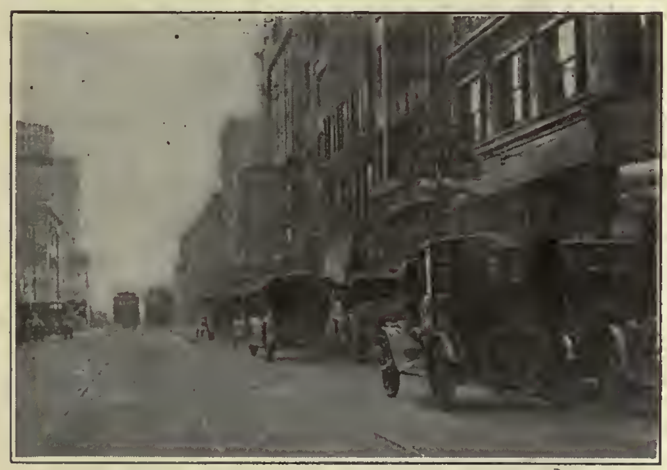


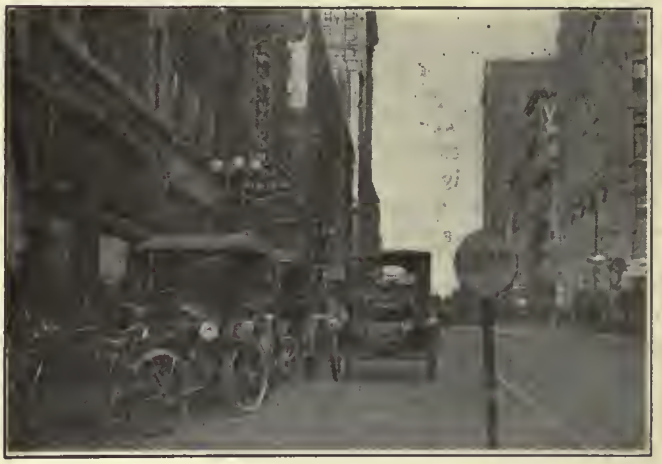


Anti-Parking Laws Allow Higher Schedule Speeds in Kansas City

The two views at the top show the appearance of Tenth Street before and after the passage of the anti-parking ordinance. Note the heavy grade and derail.

The two illustrations at the bottom are views of Walnut Street taken before the passage of the anti-parking law and showing double parking and lack of clearance.





DISPATCHING SYSTEM KEEPS PROPER SPACING

The dispatching system, the company police force, and the inspectors on the Kansas City Railways are other effective means at the disposal of the transportation department for facilitating movement of traffic, preventing congestion, eliminating delays and otherwise saving car-hours and better serving the public. Although most of these methods are in use to a certain extent on other systems, a brief description may be of some interest in showing the relation to more economical and more regular service.

All cars are operated on regular schedules. The dispatching force reports to an official known as the chief dispatcher, located in the office of the superintendent of transportation. On every line dispatchers are located at important points and at terminals. At the more important places small dispatchers' booths, with the permission of the city, have been erected at the corner. Dispatchers at the heavy points are on duty eighteen hours a day, and at other points during the rush-hour periods. These dispatchers are of course in constant touch with the office of the chief dispatcher. Their duties consist of checking the cars to see that they are running on schedule time. Any gaps in the spacing that occur are filled at once by taking cars from other lines, by ordering space cars sent from division points, or by emergency turnbacks.

Because of this system of dispatching and the ability to correct bad spacing, it is not necessary in schedule making to leave slack in the schedules or to arrange for layovers at the end of the line other than the time necessary for switching. This means a tremendous saving in the course of a year in car-hours operated in providing equal service.

At extremely heavy loading points in the downtown district starters speed up loading by starting cars by whistle signals. It is their duty to note when a car is sufficiently loaded and then give the signal to proceed, and to co-operate with crossing policemen so that when right of way is given there is no delay in starting the car. Street collectors and trainmen also work in connection with the starter at these locations.

Uniformed inspectors are employed, who act in the nature of supervisors. During the rush hours these men are stationed at all heavy points and act in case of emergency, assisting traffic officers in getting cars through. In addition they take immediate charge of any important situation that arises.

As an experiment some time ago an inspector mounted on a motorcycle was added to the force. He is stationed at a central point downtown and is able quickly to reach any point in the central zone where trouble occurs. This experiment has been so successful that several more will be added to the force of inspectors.

The company also maintains an extremely efficient force known as the police department. This force is made up of ex-policemen and its organization is similar to an ordinary police department with a day captain and a night sergeant on duty at all times. These men are commissioned special police officers. They co-operate with the city police department and are stationed at such heavy loading points as ball parks, pleasure parks, theaters, coliseum, and wherever usually heavy crowds are anticipated. They assist in loading the cars, preserving order, clearing up automobile congestion, and in any other way that a commissioned officer can assist traffic.

As a result of the policy outlined above and of the extremely large operating economies made possible by some of the methods explained, and a return of a large part of these savings to the public in service, we have increased the quality and quantity of our product and it is rapidly merchandising itself in an increased public confidence and public good will.

The Employee Is the Direct Salesman to the Public of the Transportation Which the Company Produces—Much Depends on Whether He Knows His Business

Relationship Between Management and Men —A Traffic Factor

By James P. Barnes
President Louisville (Ky.) Railway

THE obligations of management are threefold and may be briefly summarized as follows:

1. Adequate service to the public.
2. Fair wages and conditions to the employees.
3. Fair return to the investor.

These obligations are as fundamental and important each to the others and all to the undertaking as are the individual legs of a tripod. Let one fail and the whole structure totters and falls. Moreover, each expresses an obligation as well as an inherent right.

The public is entitled to adequate service. This is its right, but coincident therewith exists the obligation *on* the public of fair treatment to employee and investor.

The employee's right to fair wage and working conditions is beyond argument, but here again are the parallel obligations *on* the employee of adequate public service and fair return to the investor.

The right of the investor to fair return for the use of his property in public service is equally fundamental, but only upon condition of adequate service and fair treatment of employees.

In this triangle of relationships there exists for a single right a double obligation upon each side. Each side of the triangle touches the two other sides, and symmetry is lost when pressure is uneven and the balance is destroyed between privilege and obligation.

It is the primary duty of management to maintain the proper balance between the three parties at interest or the three forces at work, and this three-phase nature of management must be always maintained. Management should stand as the trustee for the public when it is dealing with the employees and the investor; as the trustee of the employees when they are dealing with the public and the investor, and as the trustee of the investor when he is dealing with the public and the employees.

Now a trustee is one who is intrusted with the property (or interests) of others and is bound to administer those things intrusted to his care in the interests of the rightful owner. The management of a public utility is in its highest and best sense a trust to be administered in the interest of the public, the employees, and the investor. Nor is this an anomalous situation, for only by the fair and proper treatment of all of these three parties at interest can the life and usefulness of a public utility be truly preserved.

Having in mind the three-sided responsibility and outlook of management, then, let us consider some of the details of its particular relationship with the employees. The management stands as the representative of the public and the investor when they are dealing with the employees and as the representative of the employees when they are dealing with the public and the investor. It follows then that the task of the management is first and foremost to find a point of balance where these contrasting duties can be consistently discharged. This position is necessarily one of absolute and impartial justice to all three parties at interest for the undue favoring of one party carries with it, as a matter of course, discrimination against the other two. The problem of human relations here involved is the problem of weighing and balancing interests sometimes partially or wholly conflicting, though often identical.

It is now the generally accepted basis of management that the public is entitled to the service it wants. At the risk of digression it is not out of place to say that the problem of the management on the side of public relations today consists almost wholly of the honest endeavor to determine what kind and quality of service the public really wants (*i.e.*, is willing in the mass to pay for) and to adjust the service rendered so as to satisfy the public demand to the greatest possible extent. The function of modern management is not the arrangement of arbitrary schedules with existing facilities in a mere effort to satisfy the apparent demand as indicated by riding habits with present facilities. Modern and progressive management must seek below the surface and endeavor to determine what facilities as well as what arrangement of facilities are desired by the public.

> IN this article Mr. Barnes points out how the public, the employees and the investor have mutual obligations and rights, while the management is the trustee whose duty it is to preserve a proper balance between the three parties in interest.

The management must fearlessly follow out the development of popular demand and be prepared to meet any conclusion the logic of circumstances may indicate. If the public demand is truly for new or novel means of transportation in whole or in part, even to the point of the abandonment of considerable portions of present plant, how much better is it to go courageously forth in an effort to meet, standardize and supply that demand than to sit dolorously wringing the hands and complaining of "fickle sentiment" while some broader-visioned, perhaps newly organized, competitor prepares to absorb the business that is ready and waiting for the hand of him who will reach out to grasp it! Without an open mind there shall be no progress, and he who clings to the dead past will be buried with the rest of its dead.

Modern management should, by virtue of its angles of contact with public demand, be the first to sense desire for change and improvement. With this demand formulated in definite terms, trusteeship asserts itself and management becomes the pleader with the employee and the investor for that which the public requires. Public demand will in the long run be satisfied so far as it is reasonably possible, and management can have no greater asset than the ability quickly to appreciate and promptly to meet the public need.

SYMPATHETIC UNDERSTANDING OF EMPLOYEES' NEEDS ALSO NECESSARY

It is equally true that the employee will have in the long run that to which he is fairly entitled in the way of both wage and working conditions. In the past far too much time has been consumed in negotiation of small advantages and burdensome conditions both on the part of management and employees, and far too little time has been devoted by either to the earnest, straightforward attempt to analyze, understand and sympathetically treat the ideals, desires and strivings of the other.

With very few exceptions, the executive of today has passed through a course of practical railroading which by a mere effort of memory should recall to him the nature and conditions of all phases of activity in the organizations whose affairs he administers. Unless he can know and understand these things, his right to the trusteeship of management is or should be forfeit. Sympathetic understanding of conditions surrounding each class of work upon a property is fundamental in just and correct dealing with the employees involved, and as no man can of his own activity keep in touch with all these things, save on very small properties, it follows that the first requisite for sympathetic and just relations is a sympathetic and just organization for the handling of these relations.

The distinction between duties of staff and line officers is nowadays too well understood to require more than mention, and the modern manager will avail himself of these two types of organization which may almost universally be concentrated in one general organization. The duties of a department head are dual in that he must represent his employees in dealing with the management and the management in dealing with his employees. Here are the staff and line duties almost exactly defined and, as the staff officer advises and confers as to successful strategy and tactics, so will the department head advise and confer as to successful policy and fair dealings.

Now the successful functioning of a staff depends upon thorough understanding and frank discussion of fundamentals as to both conditions and symptoms. So the staff organization must for successful functioning comprise all department heads and the type of organization adopted by modern management should for the sake of prompt and efficient work be divided into as few major departments as possible. Within each of these departments should be a distinct staff organization functioning in precisely similar manner to the general staff and serving as a clearing house for many departmental matters which would otherwise occupy the time and delay the work of the general staff.

To illustrate: It has been found that the work of large organizations can be successfully handled with a manager's staff of say five department heads representing respectively the transportation and traffic, engineering, legal (including claims), accounting and financial departments. Observe how closely this classification follows the lines of the American Electric Railway Association and its affiliated bodies and that each of these department heads is, in the work of the association, furnished with a reference library especially devoted to his own line of every-day activity.

RULES FOR STAFF MEETINGS

Staff meetings should be frequent and regular so that policies shall be consistent and logical but not so frequent as to interfere with proper performance of line duties. Generally speaking, not oftener than once a week and not less often than once a month should suffice. Staff meetings should be held in an atmosphere of utmost frankness. Personal animus and sensitiveness to criticism should be left at the door and, if possible, the claim check lost entirely. The rule of discussion should be "criticism of every point where weakness is apparent, but no criticism that is not constructive." We all know lightning storms are bad, but it does no good to complain of their effects unless the complaint results in more efficient arresting apparatus.

There has been too much in the past of the so-called executive session, which sometimes savors of conspiracy and is always subject to such interpretation. That this criticism may not arise, let there be no taboo on subjects of discussion at staff meetings. Let the one touchstone be "for the good of the property or of the industry" and let discussion be free and open with reasons given and opinions exchanged. If possible by discussion, even though more time be taken (it is seldom wasted), let decisions, especially as to major points, be unanimous.

Going from the staff meeting after full and free discussion and with knowledge of all facts and conditions bearing upon the points at issue, our line officer is doubly qualified for the discharge of his duty and the further dissemination of the real truth about company affairs.

Being a public servant our business is a matter of public concern, and there is no place in our program for "confidential memoranda" or "inside information." Rather, let all confidential matter take such form that employee, public and investor can be confident of its correctness and straightforward truth, and let all inside information be available to and understandable by all who wish to see the inside. Many a bitter complainant has been converted into a stanch friend by a glimpse of the inside difficulties surrounding the thing or element of service which touches his interests. Consistent truth telling will in the end result in a reputation for truthfulness, and he who makes none but reliable statements will in the end enjoy the reputation of reliability.

In the relationship between management and men it is of especial importance that the barriers to mutual understanding and confidence be removed. Here, as elsewhere, the initiative is with the management, and perfect frankness regarding all matters of operation and finance is fundamental. No good rule was ever weakened by explanation of the reasons for it, and no bad one ever strengthened by refusal to discuss its purport. No honest plea for relief or assistance was ever weakened by disclosure of the actual need. "Tell the truth and shame the devil" is a schoolboy motto, but a good rule for adult mankind none the less. Honesty is the best policy if policy it be rather than principle, and only upon such a basis can mutual confidence be established sufficient to meet and overcome the emergencies which will arise.

TEACH THE NATURE OF THE DUAL TRUSTEESHIP

Let every officer who has authority over men, and especially those who exercise discretionary authority, be fully instructed as to the dual trusteeship of his employment. Let him understand that he is staff and line officer both, and that he can carry the burden of his responsibilities on both shoulders only walking straight with head up and eyes to the front. Even-handed justice and a fair distribution of burdens and courtesies to all will bring sunshine to the cloudiest atmosphere and produce relations like those which surrounded a certain carhouse foreman, who because of efficiency was promoted to fill a vacancy at a larger carhouse. Twenty-odd of his men, understanding only that he had been transferred, called at the superintendent's office to request that he be left at their head "because he treated us square." When they learned that the transfer was in fact a promotion they sent him a note of congratulation and cheerfuly reported to his successor. Such relations are the stuff of which success is built, and it is not in the carhouses of such foremen or such men that strife is born.

It is not severe discipline but uneven discipline that hurts the hearts of men. The surest way to general dislike is the playing of favorites to a few who usually join the hue and cry in the end, and this rule applies throughout the organization from the humblest straw-boss or foreman to the titular head of the concern. Moreover, it cannot be effectively impressed by preachments, for here as elsewhere the initiative rests with the management, and the contacts of every-day business must be arranged to function from the very fountain-head of all authority with equality of justice to all.

Every office door should be open to all men whose activities come under the direction of that office. Many men will suffer for days together under trying conditions or under what they feel to be unjust discriminations. When such a man reaches the pitch that determines him to lay his troubles, real or fancied, before "the boss" a discouragement or undue difficulty in reaching his interview may leave him a disgruntled and dissatisfied worker, when a sympathetic reception, a friendly interview and a frank discussion might not only have turned a knocker into a booster but have brought out suggestions of real merit for the simplifying or expediting of other men's work as well as his own. The old saw that there never was but one man who was always right and he's dead, carries more than a grain of truth, and the foreman or superintendent who inclines a sympathetic ear to the troubles or inconveniences of his men will not only know better and be better known, like better and be better liked, but will find his business efficiency improved by the thoughts that will be brought to his desk.

Definitely organized vehicles for suggestion and discussion regarding every-day matters of operation and maintenance may well be instituted and a good central figure for this purpose is a safety committee or council with numerous committees functioning in all departments. On one property where a dinner is given monthly for employees of the carhouse operating the highest mileage per accident the number of miles per accident has been more than doubled over the entire property. Some of the carhouses have gone so far (and this is the suggestion of the platform men themselves) that a chart is posted conspicuously bearing the names of all platform men and a black cross marked opposite the appropriate name for each accident so that all may know the individual safety record of each fellow employee. No disciplinary action is based upon the record of black crosses but the self-discipline brought about thereby and manifested in greater caution of operation is making better operators and better men of many whose only fault was heedlessness.

Relationship between the management and employees becomes, then, just this series of relationships between man and man, man and foreman, foreman and superintendent, superintendent and department head, staff and line officer which, founded on square dealing and sympathetic consideration of both sides of every question, and, carried out upon the basis of the triangular relationship with double obligation, makes for understanding, confidence and cohesion.

But relationship between management and men is not completely or correctly functioning unless it recognizes and affects the means and methods of carrying out the employee's double obligation to public and investor, which completes his side of the square deal.

DUTIES OF EMPLOYEES TO INVESTOR AND PUBLIC

Adequate service is the right of the public. To render such service is the duty of the employees. Fair return is the right of the investor. To secure fair return is the duty of the employee. The individual employee, particularly he who comes in daily contact with the public, is seldom in a position to see the problem of service as a whole. Like a well-cut jewel, perfect service has many faces, and the outlook from one of these differs from the outlook from any of the others. The point where the work of each employee affects the safety, comfort and convenience of the public is for that employee the outlook from his particular face. Be he trainman, car cleaner, trackman or what not, each employee can know the effect which his own work should have on the public and by that standard may he measure the performance of his obligation to render adequate service. The motorman who jerks his car, the conductor who insults the complainant, the car cleaner who passes by a smudged spot and leaves a potential clothing stain, the trackman who leaves rough spots to jar equipment and destroy the nerves and comfort of passengers and passersby; each in his particular face of the jewel of service is failing in his individual responsibility to the public and is rendering imperfect or unsuccessful in his particular place the attempts of the management to achieve adequate service.

Perfect Service Is Like a Well-Cut Jewel

MR. BARNES *says:*

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No service can be best service unless every man concerned in the rendering of it puts forth his best effort to make it so. And every one in the employ of a railway company, from the track laborer to the motorman, from the transfer clerk to the switchboard operator, is concerned in rendering service and can by his best and only by his best bring that service to the point where with honest pride all can say: "We render to the public the best service that can be given." Not for less than his best effort can the employee discharge his obligation to the public, and if the discharge of the obligation is less than his best so is he entitled to less than the most that can be done for him.

Just as distinct though less obvious is the employee's duty to the investor. Tracks, cars, wires and buildings are the property of the investor and are lent for the public service. Abuse of this property resulting in too rapid deterioration or premature scrapping constitutes a breach of the employee's obligation to deal fairly with the investor. Proper economical use, such use as one would give one's own, is the fair measure of the employee's duty to the investor in the use of this property, and only by such use can the obligation of the employee to the investor be discharged and the employee become entitled to all that may be his right from the investor.

Again, the employee's double obligation places him in the position of mediator between public and investor. Having in charge the comfort of the one and the property of the other, he is in a position oftentimes to protect and defend the interests of the one from the attack or injustice of the other. To the public he says, "Without the good will of the investor and the investment of his funds, I cannot obtain the equipment to render you the service you desire." To the investor, "Without the good will of the public obtained through adequate service, I cannot earn the hire of your property." He can explain the desires of the public to the investor and the difficulties of the investor to the public for he is in touch with both and his daily work teaches him the needs and obligations of both. Now these things being so and the employee for the most part being engaged full time in his daily work it becomes the function of the management, with whom is the initiative, to bring these things to the attention of employee, public and investor. Let the employee know by square dealing throughout the organization that the square deal brings the best results. Let the public know by service rendered and shifted or altered to meet changing requirements that square dealing with the public is the rule of good operation. Let the investor know through his board of directors the getting of a square deal means the giving of two square deals. Let service be measured by the Golden Rule.

THE RULE OF THE SQUARE DEAL

Remembering that the square is not merely a four-sided polygon but is made up of two pairs of parallel lines, each square to the other, let all functions of management in relation to employees and to public and investor be discharged according to the rule of the square deal. This in its simplest terms is the heart of the relationship between the management and men: Square dealing, based on sympathetic understanding and honest endeavor not only to protect rights but to discharge obligations.

An organization thoroughly permeated with these ideals will bring about satisfaction to public, employee and investor alike; will meet no insurmountable obstacles and few difficulties; will function in bad times as in good; will, in short, perform that ideal thing—A Public Service.

Street Railway Tracks Are the Show Windows of the Industry—Object of Track Is to Sell Rides—Track Maintenance the Keynote in Transportation Sales

The Track Department As a Factor in the Sale of Transportation

By William R. Dunham, Jr.

Formerly Engineer Maintenance of Way the Connecticut Company, Now Chief Engineer Engel & Hevenor, New York

A Show Window That Sells Rides

SALES depend upon the attractive or pleasing display of the article offered. Salesmanship consists in offering inducements to the prospective purchasers as well as consummating the deal. The purpose of the writer is to try to show how the upkeep of the track structure of an electric railway will offer inducements to the public to buy transportation. The track and pavement are the show windows of the industry, for they show the buyer what he may expect in the way of comfort when he purchases his transportation. They are always before the eyes of the prospective patrons and make or mar the pleasure of riding.

The comfort and safety of the traveling public who patronize the trolley car depend on the track to a great degree. With this thought in mind, it becomes evident that good track makes for the sale of transportation, and it is only for selling transportation that the trolley came into being and exists. Street car rails or tracks are but an improved pavement for one class of vehicle, and the smoother and easier this pavement is kept the greater inducement for customers to buy the transportation offered.

From the standpoint of the railway managements the track is the fundamental part of the railroad. It is necessary to care for the transportation needs of the community in addition to being the window display.

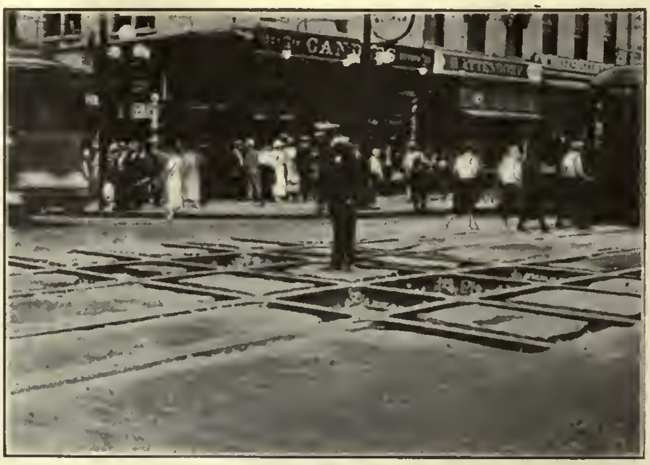
Managements can spend money to best advantage on track and should not cut the maintenance fund during every wave of economy and should not put in cheap track at any time. It is true that about the only place to cut expenses is in maintenance—cars will run a long while on bad joints, but after a while deferred maintenance means a new track or no transportation and a resultant outlay that amounts to more than would have been necessary to keep the old track in repair.

It is good business and sound economics to put in the best possible track on new construction jobs. The over-all cost of installation plus maintenance will always be less for the good construction, and sufficient experience and data are available to enable any management to put in a good track.

Track is the advertising agency of the railway business and has nothing to do with production costs. Its business is to sell rides and it should be supported to that end and its success measured by the business brought into the industry. The track advertises the railway business twenty-four hours a day, year in and year out, and its business is to make sales at the established price.

It is doubtful if many maintenance engineers look upon themselves as sales engineers for transportation, yet all their endeavors to keep their tracks in good condition have a bearing on the receipts of the company—for a smooth-running, easy-riding track offers an inducement to ride—it sells transportation. All the efforts of the maintenance-of-way men, therefore, are directed toward selling transportation, and every improvement in track conditions is a bid for riding.

The Advertising Force at Work



A Job of Special Trackwork That Makes for Comfort

Make sales by making good tracks and maintaining good tracks and then go after production costs.

One element in the functioning of the maintenance force is its relation to the public and the municipal highway officials. Here is a fine place to sell transportation. Letters complaining of bad tracks or pavements should be answered and the complaints considered. Free advice should be thankfully received even if not acted upon.

The highway officials also must be treated fairly and must be sold street railway transportation. These officials get the complaints of the public and often have the authority to order ill-advised remedies or changes. It is good business to educate these officials and to maintain cordial relations with them, so they can understand the viewpoint and problems of the transportation and maintenance men in the railway organization.

THE EVOLUTION OF THE TRACK

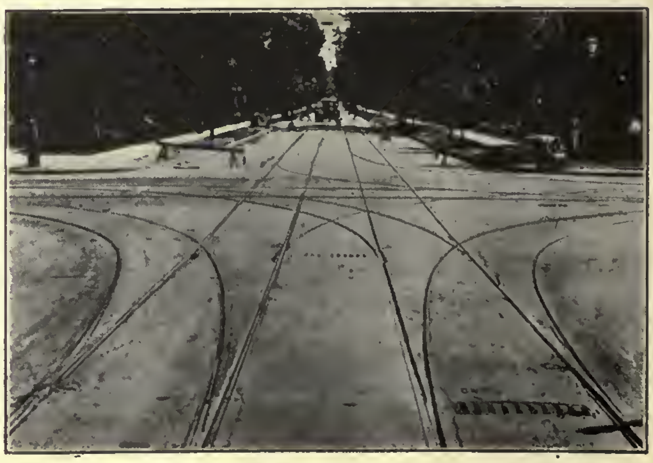
Many improvements have been made in track construction for street cars since the industry was started. It began with a light iron strap spiked down on wooden stringers in the horse car days and weighing 30 lb. to the yard; and then changed to a light T-rail, 18 lb. per yard, heavier and laid on ties with no ballast. From these beginnings, the industry has advanced until the modern track uses rails weighing as high as 140 lb. per yard with stone or concrete for ballast, and the ballast drained to prevent, as far as possible, the deterioration due to the presence of water. Improvements in joints, the weakest factor in the track structure, has kept pace with the better rails. It is a long step ahead from the light four-bolt joint previously used to the improved joint of today—be it the heavy twelve-bolted joint or the welded joint, which means no joint at all so far as the effect on the purchaser of transportation is concerned.

Perhaps no greater attempt for smoothness of riding has been brought out than the easy approach to curves, through the use of spirals or easements. It is not so hard to remember, when the car in turning a street corner would change its direction of movement with a suddenness which was most uncomfortable—but now, with the use of the easement, the change in direction is made more gradual, and the comfort of riding is enhanced, so the curve approach is a piece of salesmanship.

Curved-head rails are one of the latest salesmanship features produced by the up-to-date sales or way engineer. He will tell you that it puts off rail corrugations or cuts maintenance costs, but either one of these statements is merely another way of saying that it makes riding more comfortable—for the less that maintenance costs, the better and more comfortable the riding will be, and the greater the inducement to ride. A similar effect is obtained by tilting the rails, and this has positive effects on the purchasers of transportation. They have asked, "What makes this track ride so smoothly?" after the improvement has been made. So the difference in the riding qualities of the track, as noticed by the layman, are not always to its discredit.

As an advertising feature for a company, the track is always before the public. Its condition, and the condition of the adjoining pavement, is inseparable, and

Asphalt Next to Rails Rapidly Deteriorates



Cars Should Cross This Without Jar

while the condition of the pavement will not induce riding, it is an index of the condition of the track, for good pavement cannot exist in connection with poor track. Good track and pavement is the "show window" of the transportation sales shop. It shows what the purchaser can expect for his money, and while he is perfectly willing to be shaken up and jolted around on a "scenic railway," he expects, and is entitled to, a smooth ride for his fare when going to and from his pleasure or business.

It is not necessary in the present stage of the art to spend large sums, relatively speaking, to keep tracks smooth. With the various types of welding, in many instances poor joints can be taken care of as fast as they develop, and while the perfect welding and welder have not yet arrived, it is poor salesmanship to put off this class of work until that happy time comes. The man who has paid for his transportation is not interested in knowing that 2 per cent of the welded joints have been broken and you are waiting until the art is perfected before you do any repair work, but he is vitally interested in the fact that 98 per cent of the joints have held up, for in that amount his riding is made more comfortable.

Ready to Weld Joints

He won't say so, nor will he understand even that the joints are welded—he only knows that his riding is a smooth accomplishment. Perhaps that is one of the discouraging phases of selling transportation—if it is comfortable riding there is usually no comment; the discomforts are the facts dwelt on.

The construction of modern track for street railways is the result of years of careful study on the part of many engineering minds. It has swung from rigid to elastic construction, with exponents of both types still in evidence. As the pavement is usually rigid, the elastic type of track results in excessive pavement repairs—and usually, disintegrating pavement is a public irritant of great potency. The advocates of this type of construction point to the greater costs of track and equipment maintenance, if the rigid type is used. The modern pavement, however, usually has a concrete foundation which surrounds a good part of the rails, so that resilience through the use of wooden ties cannot be obtained without breaking the bond between the concrete and the rail. As this permits seepage of water into the substructure, it begins to disintegrate with resulting bad effects to both track and pavement, for nothing is so demoralizing to a track structure as water. To overcome this and also to take care of ground water, the modern track is subdrained. This alleviates but does not entirely remove the effects of the moisture. The ties become soft and spongy, allowing the rails to work, and in the winter frost action heaves the pavement, and surface water seeping down along the rails carries surface dirt which works in between the paving top and base until the rails have the appearance of being below grade and are between two ridges of pavement. A very unsightly condition and not conducive to the comfort of other users of the highway results. There may be instances of elastic track construction where the track and pavement remain in good condition. However, it hardly seems practicable. The semi-elastic type of track construction assumes to give resilience by interposing an elastic cushion, usually in the shape of a wooden tie, under the rails. This tie is imbedded in concrete which also imbeds the rail base between the ties. In theory, the wheel loads go through the rails at the ties only, and the resiliency of the wood relieves the hammer blow of the wheels. Just what happens to the concrete between the ties and what its function may be is not quite clear, nor is it clear how the resiliency in the wooden ties is taken up so that the movement in the rail does not break the bond between the rail and concrete paving base. The question as to how the rails are held so rigidly by the concrete paving base that they do not move and so disintegrate the pavement, and yet are so resilient that they do move but do not wear out under the hammering of the wheels, is an interesting one. They furnish a rigid support for the pavement and a resilient way for the car wheels, two apparently opposite results.

The rigid type of construction is the other extreme. It is designed as its name implies—not to move. In this type, the substructure is drained to provide for ground water; steel ties are imbedded in concrete, which extends up high enough on the rails to act as a base for the paving; the paving surface is made as impervious to surface water as it is possible to waterproof it, either by cement grout or pitch in the paving joints and along the rails or by a concrete pavement to the top of the rails. Whatever resiliency is obtained in this type of construction is that which is inherent in the rails themselves.

The advocates of elastic track construction point to the evils of rail corrugation, which must occur in the rigid type of construction, but this effect also occurs in the elastic or resilient type. There are many theorizers on the causes of rail corrugation, and as many theories. Every one of them can be proved.

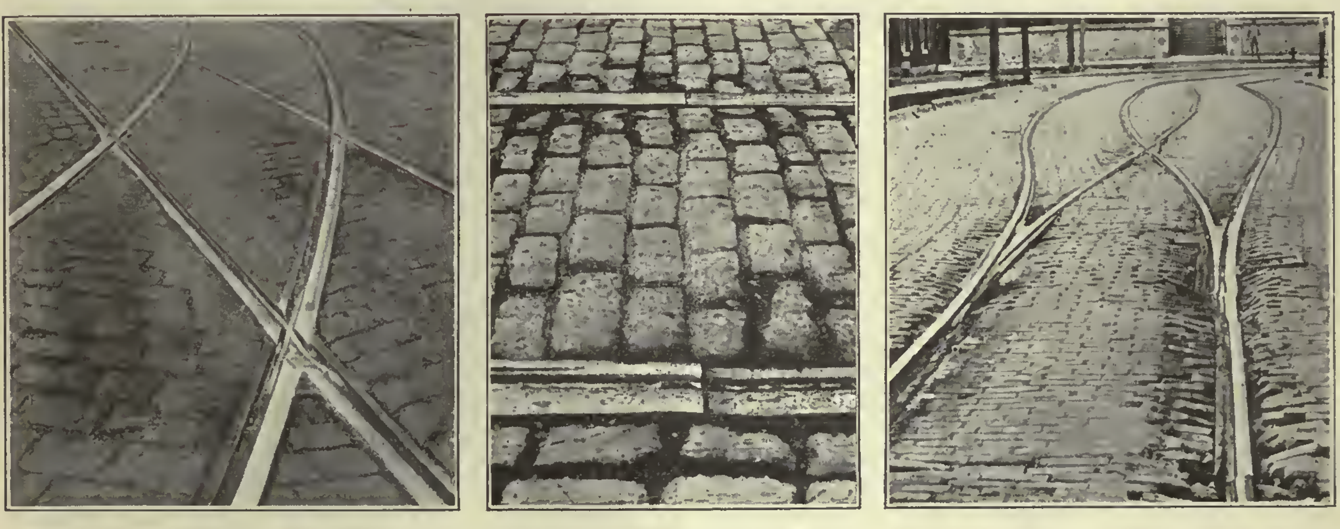
Track construction in itself can be made to sell transportation. Many examples are available where citizens write in to the railway company to advise it how to construct track on a new job or to complain about some feature of the construction work. It seems that every patron thinks he knows how to make good track, and the interested group of citizens found on a new construction job is evidence of these conditions. Such advisory letters should be answered in the same manner as a salesman answers the inquiry of a customer.

Then, again, in doing construction work it is good salesmanship to do it rapidly and without troubling other traffic. It is bad salesmanship to make all automobiles drop down over a 6-in. curb of pavement or dirt when crossing a street on which a railway company is doing construction work. A little effort and a little money to prevent these things will pay dividends through the reaction of public sentiment.

The main point in selling transportation, however, is not the type of construction so much as it is the keeping of the track in the best possible line and surface and giving the smoothest ride for the money that can be obtained. The type selected, therefore, should be determined on, by what it will cost to maintain the track after it has been built. This cost must include the maintaining of the pavement, which is the advertising side of the proposition, for the prospective passenger will judge of the track and the service by the sightliness of the street surface as this first meets his eyes.

Make and Maintain Good Joints

The joint is, structurally speaking, the weakest part of the track, the part that has been more thought over perhaps than any other feature. With the advent of the heavy deep rails, steel channel bars have been used with six, eight and twelve bolts to hold them in place. They have been welded by pouring molten iron around the rail ends, with several ways of melting the iron; special forms of bars have been applied to the webs of the rails, these bars being then welded to the webs in spots by the passage of a heavy electric current through the bars and rails, and the application of a heavy pressure against the plates; by drawing an electric arc along the top and bottom edges of the plates at the junction of the rail heads and rail bases, depositing steel from the arc by melting; or by laying a steel rod along the top and bottom edges of the plates and melting it into the rail and plate with an electric arc so that they are welded together. The plates have also been riveted together through the rail, and one type of joint has molten spelter poured in between the plates and rails—the whole being riveted. All these methods are being used in an endeavor to keep the rail ends from moving.



Examples of Poor Merchandising

The application of each method depends on the use of a relatively high temperature, and as the temperature is confined to a short section of the rail near the end this makes a critical point where the heat crystallizes the steel and a fractured rail may result, usually just back of the line of molten metal in the cast-welded joint or the ends of the bars in the electric-welded joints. This break is not perhaps a frequent occurrence, but does occur often enough to prevent use of these forms of joints by many way engineers. So far, perhaps, the welded type of joint is the better practice.

With the bolted type of joint, the continual passing of car wheels over the rail ends gradually depresses the head of the receiving rail and a "cupped joint" is formed. This small depression rapidly grows worse as its depth increases, until the whole joint disintegrates. It can be remedied at the start by grinding the two rail ends level, using one of the numerous forms of grinding machines now on the market. The depression can also be built up by welding steel onto the rail head, using the electric arc and a steel rod, the excess steel deposited being ground off with a grinding machine. Another method is to weld the joint plates to the rails and then build up the heads of the rails as this practically removes the joint. The welding and grinding require care, but laborers with a fair degree of intelligence can be trained in a short time to do this sort of work. This trouble does not ordinarily occur with joints which are welded when the track is constructed.

The larger roads have separate gangs of men who do nothing but weld, but any road large enough to operate cars is large enough to have at least one welding and grinding outfit, providing it wishes to sell transportation by means of smooth riding track, and if properly handled such an outfit makes for economical track maintenance.

Rail corrugation is one type of track deterioration the cause of which every maintenance man knows, and there are as many theories for it as there are track men, and a few more. It occurs in all types of construction, most frequently in the grooved or tram sections of rails, occasionally in the plain or standard girder types; on tangent and curved track, but generally on rails the heads of which are on a slope horizontally toward the gage line. There is one remedy, an expensive one, and that is grinding out the corrugations. The rail head, when corrugated, has a series of waves along the surface. The passing of car wheels over these waves jars the whole track and pavement structure, loosening the rails from the ties and breaking up the pavement surface. It is also very noisy and disagreeable. The corrugation should be ground out as soon as it occurs, although it has been known to disappear after a time, but in selling transportation, no chances should be taken and it is better to renew the rail if no grinding outfit is available.

Special Trackwork Costly But Essential

The most expensive part of the railway track is the special trackwork, and next to the joint, perhaps more thought has been given to its design than to any other one feature of the track structure. The first cost is high, the life is short, and the cost of renewal is large, compared with the same length of tangent track.

Special trackwork is a convenience and necessity for crossing tracks or switching smoothly and rapidly. More complaints can arise because of 50 sq.ft. of bad special trackwork than from the occasional pounds caused by bad joints on miles of straight track.

Special trackwork is very expensive to install and to maintain, but money is well spent in this manner for crossings are aggravating sources of trouble from a sales standpoint. If switching causes a car to stop or slow up, causes the motorman to throw the switch by hand or causes a bad jolt, the passengers are irritated and become nervous. Another factor in causing rough riding is that at some congested crossovers the traffic officers or late schedules will force the motorman to operate the car at high speed, even though against the company rules, and the passengers get the benefit of all the rough spots.

Another point in regard to special trackwork is that it should be smooth so as not to irritate or cause jars to other vehicular traffic. In Little Rock, for example, the automobile owners commented very favorably on the fact that the street railway had put in special trackwork which caused no rough riding in the automobiles.

Another case that comes to mind that hurt sales is where a pavement and special trackwork repair job at an important crossing was prolonged until the volume of complaints became enormous. Quick repair with the least interference with other traffic or the appearance of the street is an essential requirement to maintain public good will.

Speed of movement can be increased at crossover and switching points by the use of special trackwork and electric track switches. The electric switches save money in the long run and also do away with schedule delays caused by the motorman having to stop his car, get down and throw the switch. A psychological factor is the fact that the pasengers, when they see a motorman throw a switch by hand, think the method crude, but when the switch operates by electricity they think the idea splendid and guess as to how the feat is accomplished.

FOUNDATIONS AND PAVEMENTS DISCUSSED

The best foundation possible should be put in at all special trackwork locations, using ballast well tamped under the ties, and well drained. Provision should also be made for draining surface water away from the structure, especially at the switches and frogs; if possible, the track elevation should be such that surface water will flow away from rather than toward the layout.

Undoubtedly the best type of pavement around frogs and switches is granite block on a concrete foundation with cement grouted or pitch and pebble joints. Cement grouted pavement will undoubtedly be more permanent, but granite block with pitched joints will be easier to remove when it becomes necessary to renew the worn pieces. The average life of frogs and switches, under fairly heavy traffic, is about five years, and as the pavement is broken up from the constant pounding before it becomes necessary to renew the pieces, it is well to have the pavement of a type easily removed and when removed fit to use again. Undoubtedly a granite block pavement with pitch filled joints comes nearest to these requirements. A hard brick pavement with cement grouted joints could be used, although the constant jar of the wheels passing over the various gage-line intersections will tend to disintegrate this pavement more quickly than it will the granite block. With either type of pavement and joints between the pavement steel switch pieces and rails should be waterproofed with an elastic material such as pitch or asphalt. Cement grout should not be used for this purpose as it will shatter quickly, thus letting water seep between the rails and pavement with consequent rapid disintegration of both.

The conclusions to be drawn, therefore, are that the maintenance of a track structure and pavement are of vital importance to the advertising and sale of transportation; that the sale of transportation is as necessary to a manufacturer of transportation as is the sale of any other commodity, and while people will ride of necessity, the ease and comfort of riding should be so pronounced that the non-riding public would get the riding habit, not from necessity but because it is easy.

Managements should see that the maintenance department has the best equipment and skill at its service if they wish to sell transportation. This equipment and skill is needed for several reasons—it means speed in repair work and minimum cost, and it means good advertising in that the public takes pride in seeing modern equipment used by the railway and is convinced it is up to date and that the management knows its business.

The writer believes that the way engineers can go a long way to obtain this result by looking at their work from the viewpoint of salesmanship. While the cars deliver the goods, the track advertises and displays them and also makes for safe and comfortable riding and easy delivery.

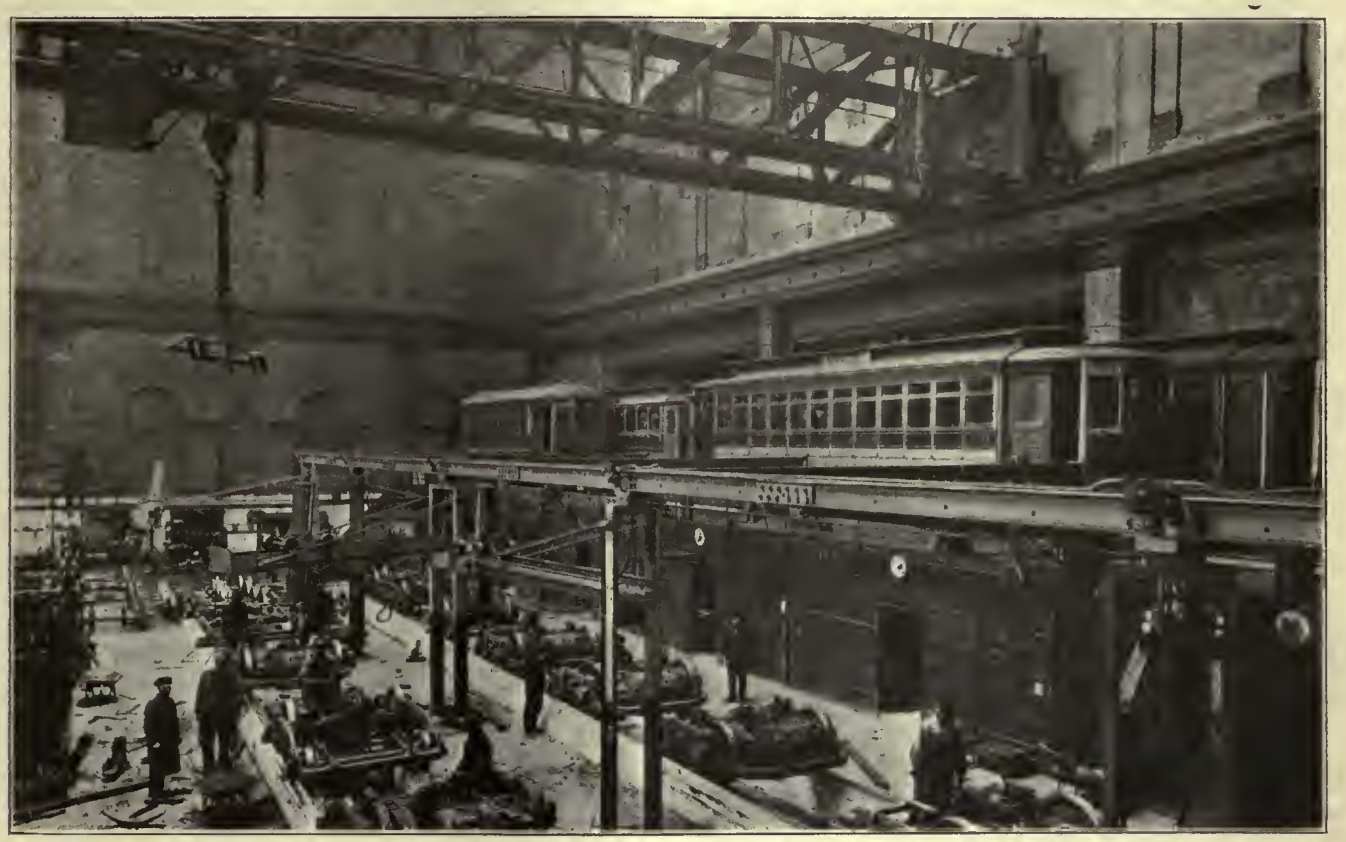
Installation of Steel Ties in Detroit

The Efficiency of a Street Railway Organization and the Class of Service Furnished Are Accurately Reflected by the Condition of the Rolling Stock Equipment

Relation of the Equipment Man to the Sale of Transportation

By J. S. McWhirter

Master Mechanic Third Avenue Railway, New York



Adequate Overhauling Facilities Make Reliable Equipment

THE QUESTION, "What part does the car equipment man take in the sale of transportation?" may be answered by the analogy between the organization of the supply company and that of the electric railway. Like the factory engineer or manager of the supply company, the car equipment man does not come in contact with the customer as does the salesman or the transportation man. But as the efforts of the salesman fail unless he is backed up by the factory engineer or manager, so will the efforts of the transportation man fail unless he is backed up by the car equipment man. Therefore, the part of the car equipment man in the sale of transportation is to meet the requirements of the company's customers from the car equipment standpoint, in order that the transportation man may have the strongest "factory" support in the sale of his product.

First of all, from the standpoint of the customer, is the general appearance of the car, in which painting and cleaning play a large part. The use of a bright and pleasing combination of colors is the basis of an attractive appearance, which must be maintained free from dirt and dinginess. The average appearance is improved by the practice of touching up and revarnishing at frequent intervals as compared with burning off and repainting at longer intervals.

The appearance of the car windows is as important as the appearance of the painted surfaces. Dirty windows are perhaps the most obvious indication that the customer is not receiving the grade of service which he expects. Floors are also closely observed by the customer, and while he realizes the impossibility of spotlessness, he is quick to resent any unnecessary accumulation of dirt or refuse. Hence the car equipment man must make car cleaning one of his most important duties, while in the design of equipment his efforts must be directed toward the elimination of dirt pockets and ease of cleaning.

Discomfort and Annoyance Within the Car Must Be Minimized

After a passenger has boarded a car it is most essential that he be carried without discomfort. Here the seat and seating arrangement play an important part.

The contour of the cushion and back, the height of the cushion above the floor, and the allowance of knee and foot space are the first considerations. Next is the question of arrangement. While there is an undoubted preference in the mind of the average car rider in favor of the cross-seat he is generally willing to sacrifice this preference on short rides in favor of the ease of access which is secured with the longitudinal seat. Then there is the question of the seating material, the factory worker generally being indifferent to the material while the office worker and shopper prefer rattan seats. Here the car equipment man must weigh the economy of the longitudinal or wood slat seat against the possible gain in patronage or good will to be secured with cross seats or rattan-covered cushions and backs.

For those passengers who cannot be accommodated by the seats, hand holds must be provided. The considerations are that these must be sanitary and sufficient in quantity.

The window is an important point of contact between the car equipment man and the car rider. While it is not necessary for window sash to be movable during the "closed car" season, in the summer time it is desirable that the lower sash may be readily and safely opened or closed by the passenger. Another chance for irritation which the equipment man can avoid is loose or rattling sash or glass.

From the passenger's viewpoint the push button signal system is important. He has a right to expect that his signal given on any push button will be audible to the operator of the car. As it is not the number of push buttons, but rather their reliability, which is important, a push button so located as to be convenient to each exit may replace a number of push buttons on the window posts with economy and increased reliability.

Heating and ventilation require careful design by the car equipment man. The main considerations are the maintenance of a moderate temperature and the avoidance of drafts and foul air. The first two considerations can only be secured with cars whose doors are so interlocked with the controller or brake that they must be closed while the car is running, and when these conditions have been met it is a simple matter to proportion the ventilating system to remove a sufficient quantity of foul air. Thermostatic heat control has been found superior to hand regulation to provide the proper temperature, but the car equipment man must not neglect its maintenance as proper operation depends to a large extent on this.

THE OPERATION OF THE MOTIVE POWER AND BRAKES MUST BE SMOOTH AND FREE FROM JERKS

Smooth acceleration is desirable from the passenger's viewpoint, while the opening of the circuit breakers or a flashing of the controller are very alarming to the more timid. The car equipment man can generally provide smooth acceleration by a careful adjustment of the resistance steps. The annoyance of blowing circuit breakers is best avoided by the use of line switches located under the car floor, but fuses must be used with the line switches to secure full protection. The flashing of controllers is greatly reduced by the line switches, which remove the breaking of the heavy arcs from the controllers, but even with this protection, controller frames must be well grounded.

As smooth acceleration is desirable so also is smooth braking. Brake handles and valves must be kept in such a condition that the operator will have no trouble in applying and releasing the proper amount of air, and the brake release springs must provide for prompt releasing of the brakes.

THE RUNNING GEAR IS ALSO AN ELEMENT IN MAINTAINING GOOD WILL

Probably the source of greatest annoyance toward electric railway car equipment is the flat wheel. In too many cases poorly laid out brake rigging has been responsible for an excess of flats. Yet flat wheels will always develop, and that car equipment man will cause the least annoyance who will get his flat wheels off the road the soonest.

Noisy gears are close seconds to flat wheels as sources of annoyance. Now that the split gear is a thing of the past and efficient noise-reducing gear lubricants are available, the problem is largely one of the worn axles and axle-bearing housings. The elimination of these requires an expensive program of arc welding and reboring for the maintenance department, yet the car equipment man finds this the most economical course in the long run.

Loose and rattling truck parts give the public the impression that a car is on the way to the junk heap. When this condition prevails the car equipment man is more apt to be at fault than the truck and careful attention is needed.

The car rider appreciates an easy-riding car just as he appreciates an easy-riding automobile. Some designs of trucks are hopeless misfits from this important viewpoint, but it is the duty of the car equipment man to provide easy-riding trucks to the greatest of his ability.

CONTINUITY OF SERVICE IS IMPORTANT

Continuity of service is as important to the electric railway as it is to the power company. Delays in either case result in loss of revenue. Motor failures are an important source of delays which can be largely prevented. Flashing can be prevented by close attention to brushes, brush-holders and commutators. Coil trouble can be minimized by dipping, baking and hot banding. The remaining electrical troubles are more easily avoided.

While certain car riders are impatient of folding doors and steps, it has been found that the elimination of boarding and alighting accidents produces much more good will than is lost by the use of these safety devices. It may be noted that the accident-saving efficiency of these devices is materially increased when they are so interlocked with the control or brake apparatus that the car cannot be started until the doors are closed. Another element of good will is the number of pick-ups which are being scored by automatic wheel guards in knock-down cases. The maintenance of these safety devices is an additional expense to the car equipment man, but he is glad to maintain them for the benefit of the organization as a whole.

The hand brake is a safety feature of the modern car which the customer expects will be available for his protection when needed. The co-operation of the transportation man with the car equipment man is necessary to keep the hand brake in operating condition, but the latter should provide a brake with which the car can be controlled as readily throughout its range as with the air brake throughout the entire range of piston travel of the air brake.

While the human element in car operation is fallible the car rider expects the car equipment to be infallible, and it is the duty of the car equipment man to meet this expectation. Brakes, wheels, sanding apparatus and the emergency features required for stopping the car must be in safe operating condition at all times, but this is only another way of saying that they must be well maintained.

The part of the car equipment man in the sale of transportation is thus to provide to the best of his ability bright, clean, well-maintained cars which are suited to the requirements of the car rider, and which operate smoothly, reliably and with a maximum of safety. If he would succeed in fulfilling his part he must be willing to devote all of his thought and an eternal vigilance to the task. The points enumerated constitute the major portion of his creed. It is evident that he must be a man of broad gage.

Car Design Is Intimately Connected with Volume of Traffic—How the Car Can Be Made Attractive to Patrons and Thus Increase Business

The Car as a Transportation Salesman

By Norman Litchfield
New York

WHO is the true sales agent of the electric railway—the president? Hardly, for at best he can come in contact with but few of the road's patrons. The general manager? Perhaps more nearly so, but he is apt to be too busied with the prevention and settlement of strikes, the hammering down of the ever-soaring operating rates, placating commissions, and buried under the multitudinous tasks that form the heavy chain which, like Marley's ghost in Dickens' famous story, he is doomed to carry clanking behind him throughout his existence.

And so we would find it if we traveled down the line of the various officials, that one and all, necessary though their functions be, are tied and bound by their duties so that as salesmen of their company's only product, transportation, they fail to get acquainted with their customers and make sales—a very picture of unsuccessful salesmanship. They play rather the part of the production end of the plant, analyzing the needs of the market and providing the necessary output and an attractive product.

How does a customer get to know a manufacturing concern? Through its salesmen, of course; that goes without question. Then how does a patron get to know a railway? Chiefly, and in the case of the average electric railway, almost entirely through its cars. We may therefore fairly state that the cars form the sales force of the railway. If the headway be too great and Salesman Trolley Car does not show upon the job at the psychological moment and Salesman Jitney steps in, he gets the business. Why not? "Absence makes the heart grow fonder" was never said of a trolley car, that's sure. And if Salesman Trolley is dirty and his shoes need shining and he is loud and noisy, who wants to associate with him? A wise receiver, now gone to his rest, spent the greater part of his first receipts in painting his cars, and the attitude of his public quickly changed. No matter how decrepit the internals might be, the surface looked clean and shiny, and people were willing to ride in it. It's the rosy cheek that sells apples; it even often gets husbands, and so why not patrons?

If we agree that the trolley car is the road's most potent salesman, we may then proceed to analyze the characteristics which make for success and point out some of the errors time has shown to exist, and so pave the way for a better understanding with our patrons and a surer marketing of our product.

Let us assume, therefore, to begin with, that the transportation department has provided a schedule with headway sufficiently close so that I, the patron, when I come into the market, find Salesman Car conveniently near when I call for him. Note that phrase, "When I call for him."

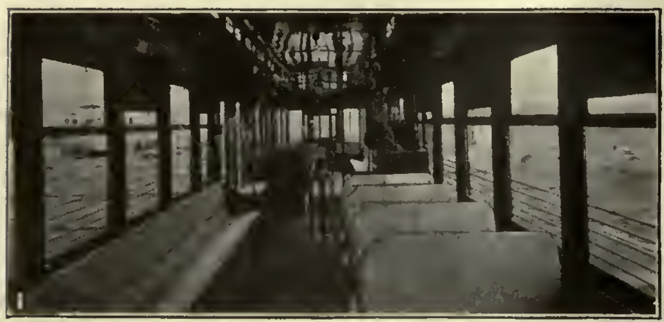
If he thrusts himself noisily upon me when I don't want to hear him, disturbing my work and mayhaps my rest, you may be assured I will have none of him and will turn to Friend Jitney, who, though he squawks a bit too much, yet travels on rubber heels.

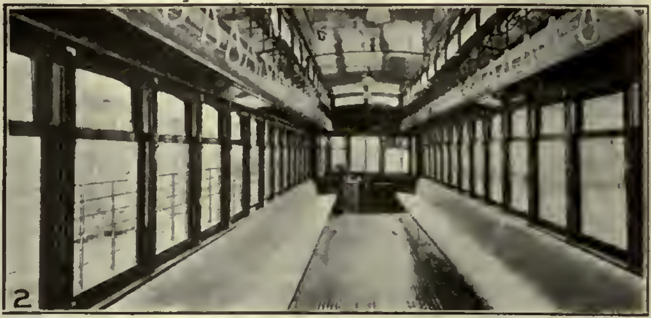
NOISE MUST BE REDUCED

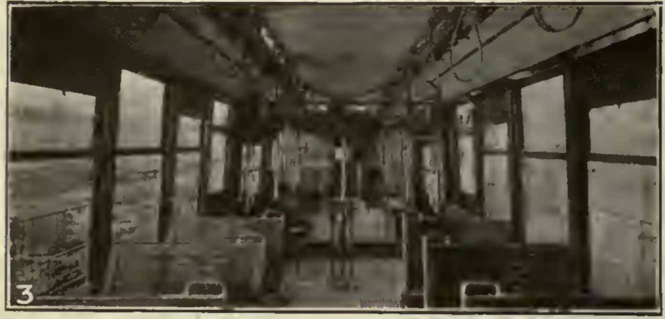
Therefore, to begin with, we must provide means of making our cars run quietly. Notable work has been done along this line in the use of helical gears for motors, strict truck maintenance, eliminating loose and rattling parts, non-chattering brake hangers and the use of wooden blocks for the support of brake rigging. Another aid is the pit grinder, which can help make the soul-racking flat wheel a thing of the past. Then, too, the science of lubrication has been developed to the point that on a well-conducted property the hot box is a rarity where formerly it was a troublesome pest. In this part of the subject comes the question of the car weight, for it is undeniably more difficult to operate heavy cars quietly than light ones, not so much because of any inherent defect in the car itself, but because of the greater blow given at rail joints and crossovers. Who has not lived at some time near crossovers, where one could almost tell the class number of the car by the noise it made?

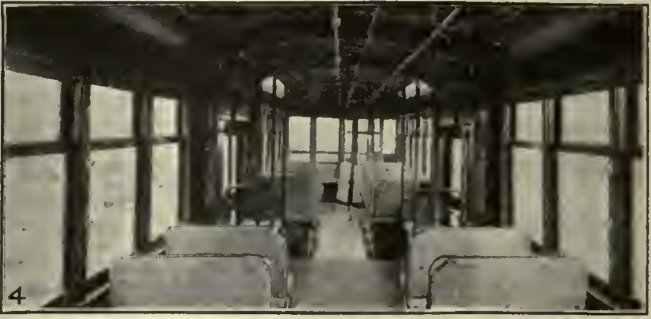
No specific cure-all for noise can be given, but those items already mentioned have done their part in making a more favorable attitude of the public toward the roads.

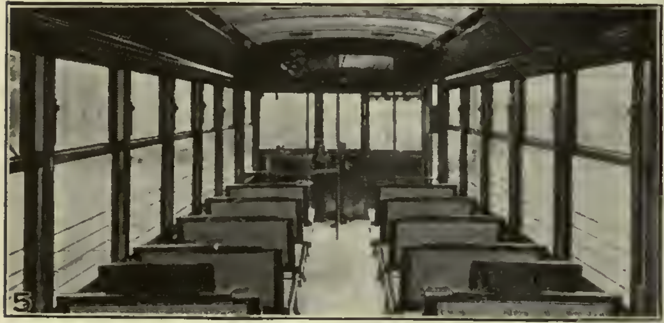
The car approaches, and I attempt to board. If many people are leaving the car, do I have to stand out in the wet and cold until the last man has disembarked before I can enter? Or, on the other hand, do I still

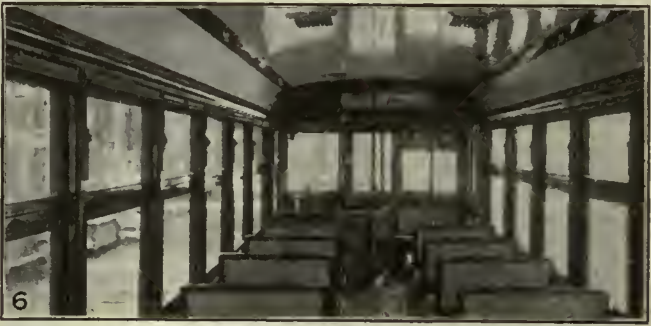


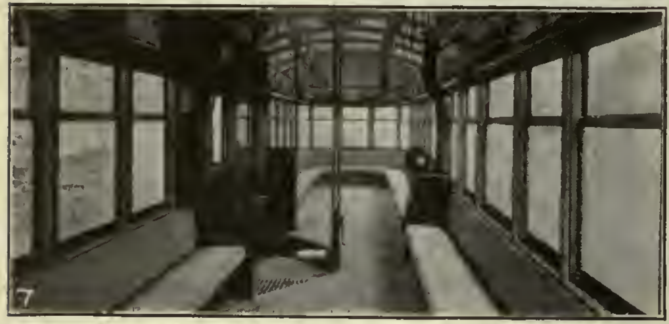


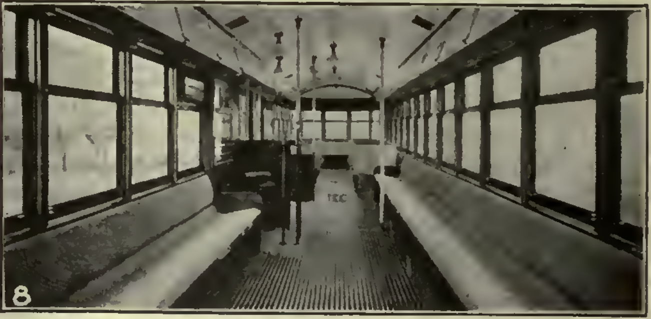


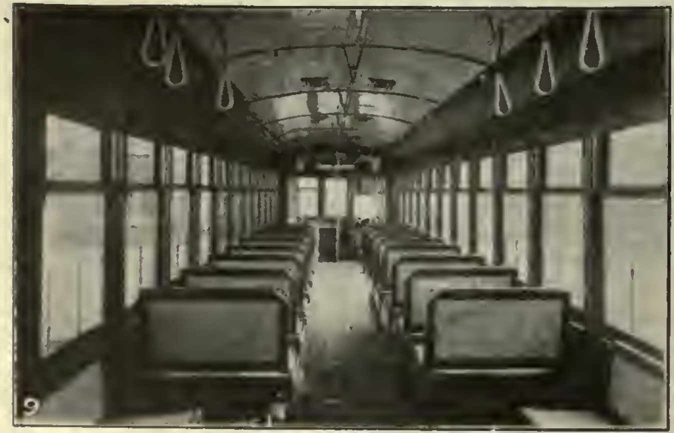


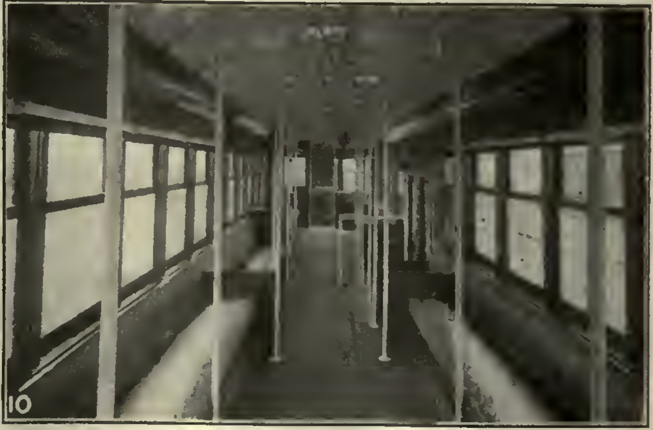












Types of Cars—Interior Views

No. 1—Center-Entrance Car with Staggered Arrangement of Seats to Equalize Load.
No. 2—Double-End Car with Longitudinal Seats.
No. 3—Center-Entrance Car with Longitudinal Seats Near Well and Cross Seats Near Ends.
No. 4—Center-Entrance Car with Cross Seats.
No. 5—Safety Car with Division for Colored People.
No. 6—Safety Car with Separating Partition for Operator.
No. 7—Center-Entrance Trailer.
No. 8—Peter Witt Car with Longitudinal and Cross Seats.
No. 9—Double-End Car with Cross Seats.
No. 10—Peter Witt Car with Stanchions Instead of Hand Straps.

have to stand out in the weather while the conductor is laboriously collecting the fares of a long line of passengers ahead? How often is my enthusiasm for a road dampened before ever I have left the pavement? So herein has come about the development of five distinct classes of car:

1. Rear entrance, front and rear exit with separate motorman and conductor.
2. Center entrance and exit, with crew of two.
3. Front entrance and exit, with crew of two.
4. Front entrance and center exit, with crew of two.
5. Front entrance and exit, with one-man crew.

We cannot now go into a discussion of the relative merits of these different types of car. Like salesmen, a different type is needed for each set of conditions. But in each class there are certain constructional details which bear vitally on the selling of transportation, and it is with these we wish to deal.

STEPS AND DOORS

First among these comes the question of the number of steps, whether one or two. In answering this it must be made clear just what is meant by the "number of steps." Is it to mean simply external steps or is it to include all the upward rises from the street level to the car. If external steps are the criterion, there can be but one answer, namely, one step, largely for the reason that folding doors and steps have become a *sine qua non* of safe operation, and it is not practicable to use two external steps and have them fold. If it means, on the other hand, the total external and internal steps, then the question becomes not of one or two steps but rather of one, two or three steps, counting the external step as one, the platform as two and the body floor as the third. As to which is the more preferable arrangement, this question, like many others, cannot be settled entirely by itself, its solution generally being a compromise between the desirable rise of each step and the height of the top of the motor from the track.

We must therefore first give consideration to what constitutes a desirable height of step. This is determined by considerations of comfort, safety and speed of interchange of passengers. For stairs a rule in common use by the architects provides that the sum of the lift and tread shall equal 18 in., this giving a proportion which has been found by experience to be one which is comfortable and which makes a flight of steps which can be traversed at a reasonable rate of speed. This matter of tread and lift proportion is one which is frequently misunderstood, it being sometimes thought that if the step is low it will be comfortable, which is not the fact if the tread is not properly proportioned. I have in mind one stairway on a suburban line which has badly proportioned low steps which are a constant source of complaint—verbal if not written—on the part of the road's passengers.

For the first step from the street level to the external step or well of center-entrance cars it would be desirable to limit the height to 12 in. It must be admitted at once, however, that this has been accomplished in but few instances, and then somewhat at the sacrifice of other important features, and the best that can be accomplished is about 14 or 15 in. In fact, this may be considered to be about the general standard height, practically no cars now being built with anything over 15 in. where external steps are used.

Having determined 14 in. as the height of the first step, the two others become dependent on the height of the body floor from the rail, which in itself is dependent on the height of the motor. Much effort has therefore been expended by the motor designers to produce a motor of minimum diameter. This has resulted in a car floor averaging about 34 in. from the rail, with a maximum of say 36 in. With 14 in. first step, this leaves from 20 to 22 in. to be divided up between step to platform floor and step to car floor. Now, it is particularly on the step from the folding step to the car platform that the matter of proper proportion of tread to life becomes important. Using the formula already quoted, with tread say 10 in. or so, the proper lift becomes 8 in. Two conditions prevent the attainment of this ideal, the one the necessity for drawbars in many cases under the platform and the other the vastly increased use of the life guard installed under the platforms and for the successful operation of which sufficient clearance must be maintained between it and the platform arms for the body of a grown man or woman. This means a platform floor height of about 27 in., making the lift from the external step to the platform floor about 13 in. This is uncomfortable and makes for accidents in boarding and alighting. This leaves the lift from the platform to the car floor about 7 to 9 in.

To sum up, therefore, it will be seen that the selection of step heights is not one that can be made at will, but is controlled by well-defined conditions, and that for the end-entrance car the average figures are:

	Desirable	Actual Average
Rail to external step	12 in.	14 in.
External step to platform	8 in.	13 in.
Platform to car floor	7 to 9 in.	7 to 9 in.
Total lift	27 to 29 in.	34 to 36 in.

We have therefore been forced to put our patrons to discomfort at the very entrance to the end-entrance car, although the matter is one which has been much improved in recent types as compared to designs of some years ago.

With the center entrance and exit there does not exist the necessity for body clearance underneath the car framing and hence better conditions are found. It also is almost universal to use sliding doors, without external steps, a common feature being to have a center well from 14 to 15 in. above the rail, a step from well to car floor of from 9 to 10 in. and a ramp from this point to the necessary motor clearance level.

In the end-entrance, center-exit car the exit is built with the car floor flush and with two internal steps of dimensions about:

From floor to first step	10 in.
From first to second step	10 in.
From second step to rail	14 in.
Total	34 in.

Confronting the would-be passenger at the time of boarding are the doors with which all modern cars have their platforms equipped inclosing the car and protecting the crew and the passengers from inclement weather. How shall they be operated, by hand or by power?

That is a question that must be left to the opinion of the individual operator, for as far as the passenger is concerned both work reasonably well, and it is questionable whether his desire for the company's product will be affected one way or the other, whether the "gates are set ajar" by compressed air or by brute force. On the other hand, from the viewpoint of the crew, the pneumatic operation so lessens their labor that it should tend materially toward giving them an attitude favorable to the interests of the company, and so help to improve the quality of the company's only output, transportation, which is delivered to the customer through the medium of the crew, who if they be worn out and grouchy inevitably arouse in the passenger a feeling of hostility. And it should be noted, as the writer has frequently observed, that this hostility is not directed against the individual conductor or motorman, but against the railroad and its management. That might form an interesting subject for thought on the part of some of the expert psychologists who masquerade on our payrolls in the guise of publicity men.

Hence the welfare of the crew is in no small sense vital to the successful marketing of transportation, and pneumatic operation of doors and steps should go a long way in obtaining the desired result, and it may be remarked in passing that manufacturers state that the large majority of the cars built in the last five years have been furnished with pneumatic doors. If it be a safety car, then pneumatic operation, preferably foot controlled, is a necessity to permit the operator to be free at all times to make change, issue transfers, etc., and get away promptly.

Closely connected therewith too is the matter of safety, for if the doors be pneumatically operated it is possible and customary to interlock them with the control and the brakes so that they cannot be opened until the car has stopped, or to start the car until the doors are fully closed. Some one may ask, How does such an arrangement sell transportation? The answer may be somewhat negative, but is none the less apt, that a hurt passenger can lose the company many more dollars than the amount settled by the claim agent, for it is certain that no amount of money ever made up for the loss of an arm or a leg, and the maimed passenger becomes the worst possible kind of publicity agent whose workings, while not always visible, are surely there, undermining the company's credit and stealing its patrons.

While therefore the pneumatic door devices may cost more than the manual arrangement, the balance seems to be in their favor, and we can rightfully say that they too aid in "selling transportation."

FARE COLLECTION

We have thus assumed that our passenger is safely on board the car, housed safe and snug, but, alas, if it be a prepayment car, and the crowd be great, he may still be standing in the street, held up by the line of people in front of him, who, oddly enough, are trying to present some money to the railway company, a strange and unusual proceeding! And more strangely, it is often here that apparently the most effort is made to slow up the proceedings, as it were. One would expect, rather, that the fare collector would be trained by the starving company to pounce upon his victim and extract the necessary nickel from him with the minimum of delay. It sometimes appears that so much attention has been paid to the prevention of the loss of the fraction of a per cent of the revenue through the peculations of the crew that it has entirely blinded our eye to the fact that we are not getting our passenger on quickly enough and with due regard to their comfort. Protecting railings should be carefully studied and reduced to a minimum and the farebox placed where it will allow the general average pick-up load to board the car and have the doors shut before the first man pays his fare. This presupposes the fare box entirely off the platform, and, if weather conditions permit it, away with bulkheads and everything else that hinders free movement of passengers! Adequate change-making machines and foot-operated registering devices all help, but there is still room for improvement and the door is wide open to the inventor who perfects better and more automatic means of fare collection and registration.

So at last we have our passenger safely in the car, having had due regard to his safety, his comfort in climbing the steps, etc., and have succeeded in separating him from his nickel (I write in New York), or in more generous towns his dime. It is astonishing when one jots it all down to see what care and attention has been paid to the mere getting our friend on and into the car. I doubt if our millions of riders ever begin to appreciate it, but make but one error in any of these points and they will appreciate your mistake, never fear, and the public is a past-master at the expression of such appreciation.

COMFORT IN SEATING

Having paid his fare, the passenger naturally turns his thoughts toward the possibility of a seat, and he attempts to thread his way through the throng, which, regardless of the type of car, always congregates around the entrance, resting its weary frame against anything leanable against. His comfort is then vitally affected by two things which are practically inseparable in their importance, namely, the aisle width and the character of seat. Here comes in the consideration of what constitutes the aisle and what the most desirable type of seat. The latter really comes first, and the selection should be made according to the character of the service. If it be one of frequent interchange of passengers, the personnel of the load changing several times in a trip, the longitudinal seat is desirable, as it gives the widest and most flexible aisle, allowing free movement of passengers so that they are more likely to distribute themselves throughout the length of the car, and furthermore the short rider is not much interested in having a cross seat.

If, on the other hand, the service is one where the load is picked up in a small area and carried some distance to various points where they disperse to their homes, then the cross-seat arrangement becomes the proper one, provided the way clearances are such that a reasonable width of car can be used. For it must be remembered that, regardless of what width we make the actual seat, for comfort each person should have about 18 in., and unless we put arms on the seat will take that much, whether we as operators like it or not. Therefore with two cross seats, one on either side of the central aisle, 6 ft. are going to be occupied by the seated passengers, and unless a reasonable width of car is possible the clear aisle will be so narrow that congestion will result and passengers will be seriously inconvenienced and annoyed. If it is less than this the aisle is bound to be congested and passengers seriously inconvenienced and annoyed.

Then comes the question of the space that shall be allotted between cross seats. It certainly should be sufficient to allow a fairly tall passenger to sit in comfort, not always in a rigidly upright position as some cars require, and further to place a reasonably sized bag under his knees and in front of the seat. To attempt to work too closely is but folly, as it does not please the passengers and tends to slow up passenger movement so that, if the headway be close, less passengers can be carried past a given point than if fewer seats were furnished. In fact, it would seem that in two things there has been somewhat of a tendency to go too far, the one in the extreme lightening of the car and the other in the crowding in of seats, merely as a talking point that so many seats have been provided.

Having seated him or herself in the corner next the window, the passenger attempts to rest his arm on the window sill, and often finds it missing; a slight inconvenience, but nevertheless one which is not only an inconvenience but something of an irritation, and the small amount of weight that is saved by its omission certainly does not justify the possibility of making the passenger uncomfortable and put him in a mood wherein he is apt to find fault with the company. It is all very well to argue that the aisle seat is built without an arm rest, therefore why not the window seat? The answer is obvious that it is too bad we are forced by our narrow city streets to omit the arm at the aisle so as to give more free aisle room. Here the advantage in flexibility of passenger movement outweighs the discomfort to the individual and is therefore properly condoned, but not so at the window. By all means let us have the arm rest.

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Tyes of Cars—Exterior Views

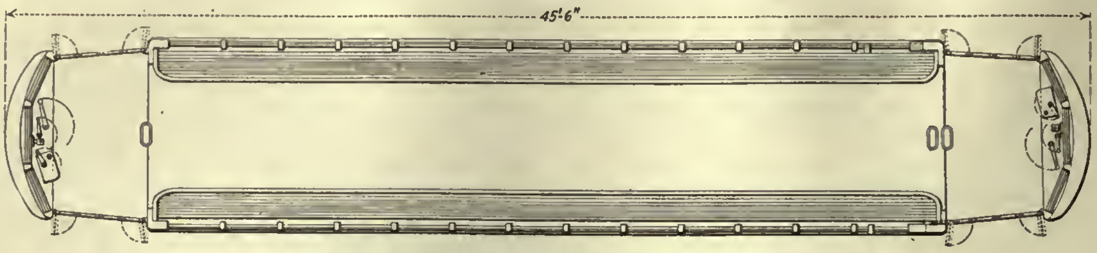
No. 1—Safety Car.
No. 2—End-Entrance Car with Cross Seats.
No. 3—End-Entrance Car with Longitudinal Seats.
No. 4—End-Entrance Car with Double Folding Steps.

Tyes of Cars—Exterior Views

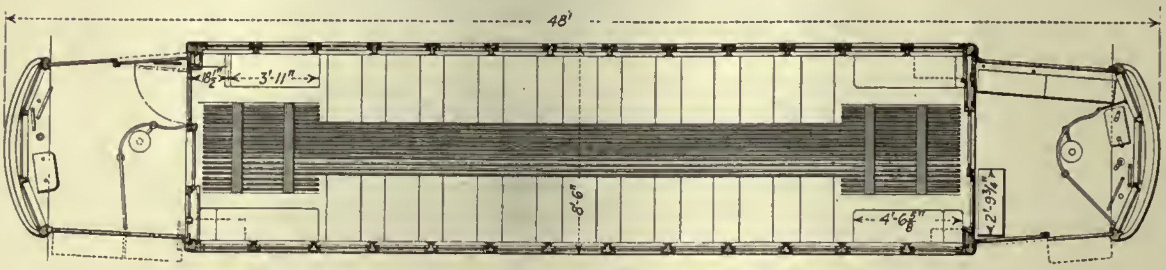
No. 5—Peter Witt Car.
No. 6—Center-Entrance Trailer.
No. 7—Center-Entrance Trailer with Double Doors.
No. 8—Safety Car.

For windows we have the choice of one of four arrangements: First, the double sash in its two varieties, one with the lower sash designed to raise, the other with the lower sash stationary and the upper sash designed to drop; second, the patented semi-convertible arrangement in which the whole sash lifts into the roof, necessitating a rather awkward and displeasing looking ceiling arrangement; third, the single sash designed to drop into a pocket, and, fourth, the single sash arranged to be removed permanently during summer weather.

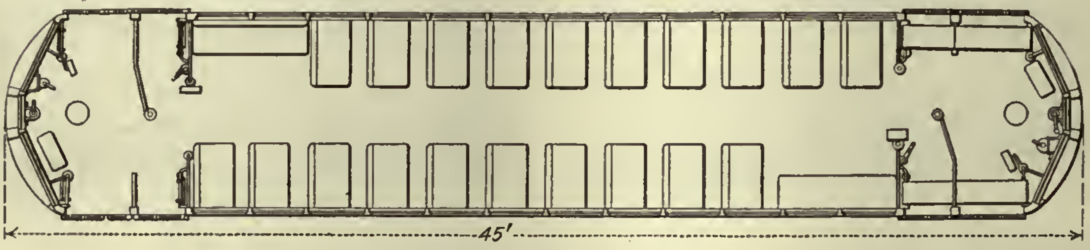
Which pleases the patrons of the road most? I wonder if that question has always been uppermost in the minds of designers. It sometimes seems not,



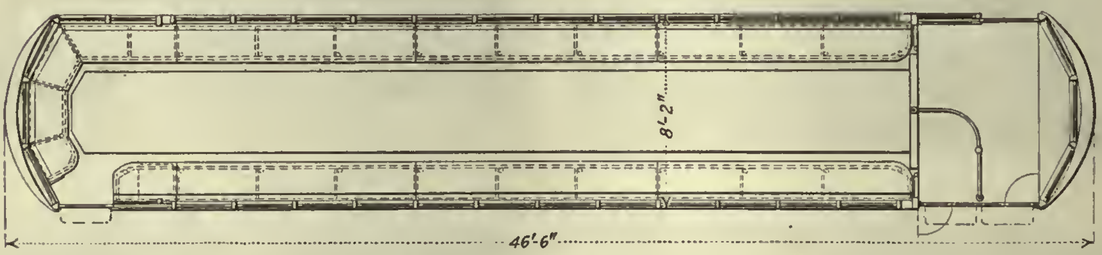
Double-End Car with Longitudinal Seats



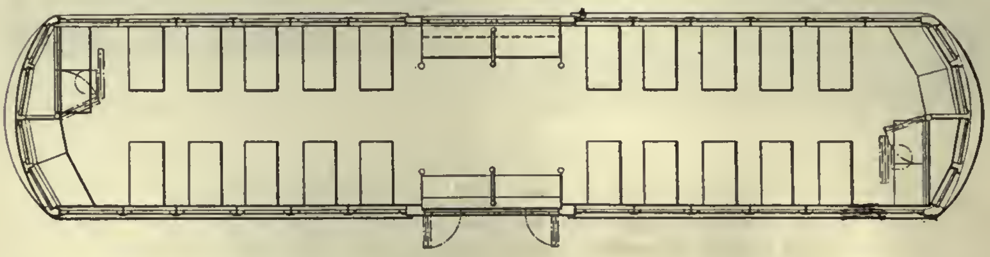
Double-End Car with Cross Seats



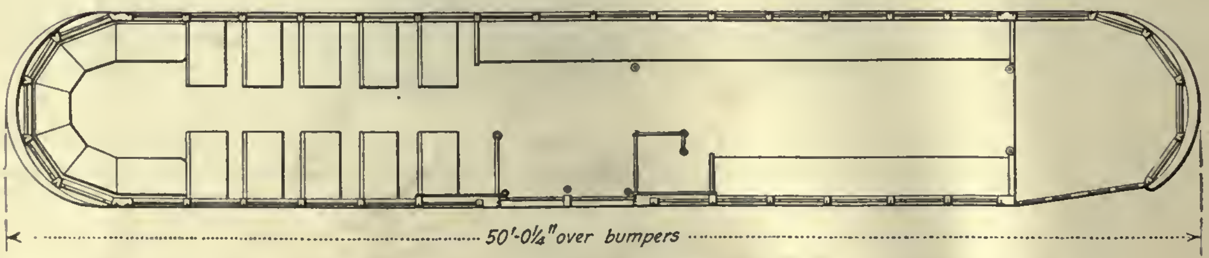
Double-End Car with Cross Seats



Front Entrance Car with Emergency Exit



Center Entrance Car



Peter Witt Car

Plans (Drawn to the Scale of ⅛ In. = 1 Ft.) of Typical Double-Truck City Cars

whereas it should be, for it does not take many additional passengers to pay for whatever may be the additional cost of upkeep or power consumption of one arrangement over the other.

Let us analyze the matter. In the first place, no one in these days of good-looking houses, cars and automobiles likes to ride on a car which has not a pleasing interior; secondly, he wants to be able to see out with the least obstruction to his vision; further, he desires to be as cool as possible in the warm summer sun, and yet hates to get chilled and wet if the summer shower suddenly descends. And all the time we must remember that if he is sitting in a cross seat he demands his full 18 in. width of seat. That is a specification of desires that is troublesome of fulfillment, as is evidenced by the numerous varieties of window construction that have been brought out.

The decision, if it were left to the passenger, I believe, would be for the single sash dropping into a pocket for longitudinal seats, and for cross seats a single stationary sash, removed altogether in summer time, with a good substantial curtain that he can pull down in case of rain.

Now, the latter arrangement undeniably puts a big burden on the railroad company, requiring it to provide large space and arrangements for storing the sash in the summer time, and probably the best compromise is the double sash, with the lower sash arranged to lift just as far as it can be made to do so.

HEATING AND VENTILATING GO HAND IN HAND

The reverse of these conditions obtains in winter time, for then the passenger wants the window closed and a reasonable heat provided. The heating of the car, it may at once be said, has been pretty thoroughly worked out and the heater companies are prepared to provide heaters which will maintain an even temperature of about 50 deg. F., which is the most comfortable for passengers, who as a general rule in city cars do not wish to remove their overcoats or their furs with which they have provided themselves in cold weather. But this requires attention of one sort or another to maintain the even temperature desired, as much or even more discomfort being caused by an overheated car as by a cold one. The true solution seems to be the use of a thermostat automatically controlling the heaters, and while they are not as yet entirely perfected, yet they have been brought to a stage of development where they perform fairly satisfactorily, and the large amount of power saved by their use considerably overbalances the cost of their upkeep.

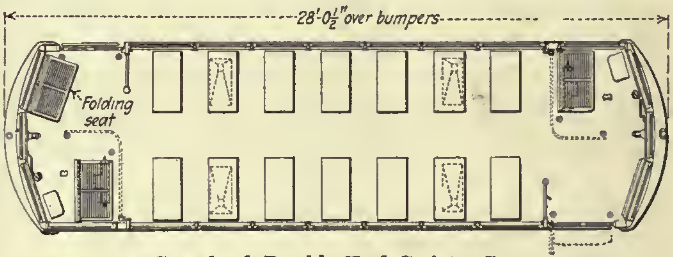
Closely in hand with the matter of heat goes that of ventilation, a subject on which there has been and even yet is about as much misinformation and ignorance as any subject with which designer and operator have to do.

It was the old theory that poor ventilation was caused by an excess in the air of carbon dioxide, the waste gas that we breathe out from our lungs.

Careful experiments made some years ago at one of our large universities, however, threw some light on the interesting and disputed subject. A number of men were inclosed in a large glass box and kept under observation while they pursued various activities such as reading, writing, etc. In the meanwhile no fresh air was admitted into the box; it, however, was equipped with electric fans, which at the beginning of the experiment were not in motion. After a time the inmates began to show signs of physical exhaustion, and then the fans were set in motion and the men immediately revived and picked up their work again, and continued working without serious discomfort even though no "fresh" air had been admitted and the CO_2 content of the air was very much higher than generally considered desirable.

Further practical experience has been along the same lines, so that it seems to be pretty well established that to secure satisfactory and comfortable ventilation enough cool, fresh air must be admitted to prevent foul odors, and it must be in gentle motion so as to provide sufficient evaporation from the skin of the passengers so that they will not suffer from excess bodily temperature, and at the same time the motion of the air must not be violent enough to cause a strong draught. It is not possible in an article of this character to discuss the merits of various systems of ventilation, and it can merely be pointed out that the foregoing constitute the fundamentals of good ventilation and that the findings are rather against the pre-heating of the incoming air and the use of any type of ventilating system which will not cause the free admission of cool, fresh air when the car is moving slowly or is stopped altogether.

The American rider, as a rule, is a cleanly and somewhat particular person, and to a large extent his nose rules him in his judgment of the railway company. The matter of ventilation, therefore is one, aside from a matter of health, that should receive careful and intelligent attention and should not be lightly shoved aside for purely constructional reasons.



Standard Double-End Safety Car

CURTAINS HELP

The next thing that affects our riders' comfort and convenience is that of the window curtain. Some discussion has arisen of late whether these are not merely a useless extravagance. This seems doubtful. The railway company in accepting its passenger tacitly agrees, within reason, to carry him to his destination in safety and comfort, and in both of these items the curtain plays its part. Most all riders are readers, and no one can read with full sunshine on the printed page letter in comfort or in safety, for the glare on the white page is an acknowledged severe strain on the eyes and one which should be avoided. Again, in case of sudden storms arising in the summer, when the windows are open and have remained open for some time, even the most ardent advocate of this or that style of window will agree that occasionally (some of us think frequently) the windows stick and it is impossible to close them. Then the question of the presence or the absence of the window curtain comes very much to the front and, if absent, ruined costumes and disgusted riders result.

Conditions vary of course, and too sweeping a conclusion should not be drawn, but in the main, and with reasonable prices in a period of the President's "normalcy," which it is to be hoped is at least on the horizon, the verdict is for them, as constituting one of the small things that represent "service."

LIGHTING ARRANGEMENTS NOT UNIMPORTANT

Being seated comfortably, housed snug and warm and dry, and being, as aforesaid, a somewhat literary person, the rider opens his newspaper or his favorite "movie magazine" and starts to read. Now, in the matter of illumination, I think we are more inclined to be overgenerous than stingy. Many of our cars belong, so far as age is concerned, to the era of the old "16-candle power" carbon filament lamps, and the lighting system was laid accordingly. Even then, if the voltage regulation was reasonably good, the amount of illumination provided was large and the cars presented generally a decidedly brilliant appearance. To realize this, we have only to turn our minds back to the wonderful center oil lamp of the old horse cars with its many-faced prismatic reflectors, whose sum total of candle power was so small that it seemed like the coal fire of Scrooge's clerk, which if poked at all, went out, giving up the ghost and saying, "What's the use?"

Then later came the marvelous Mazda lamp of today, a very scientific baby whose christening was not in candle power, of the meaning of which we had a glimmer of understanding, but in something called "watts," so that we hardly realized that we were obtaining a unit of double the brilliancy, and we stuck them in our cars, lamp for lamp, in the old socket just as they were, turned on the "juice," and sat back and exclaimed, "My, isn't it fine and bright!" And the funny thing of it is that we are hurting rather than helping our eyes. For the eye is so constructed that light is admitted to the retina, whose function is somewhat that of the "movie" screen, through the pupil, which is a shutter, or rather an aperture, which automatically opens or shuts to admit more or less light to the retina as it finds it well for the general well being of the eye. This accounts for the fact that when we enter a dark room at first we can see nothing, but gradually things begin to appear out of the darkness and we are able to find our way about, even though falteringly. This is due to the fact that the pupil has opened to its widest extent, admitting all the light there is and producing thereby a faint picture on the retina. Equally so, when suddenly exposed to a very intense, brilliant light, the pupil immediately contracts and admits a smaller amount of light to the retina, and hence the picture is somewhat dimmer.

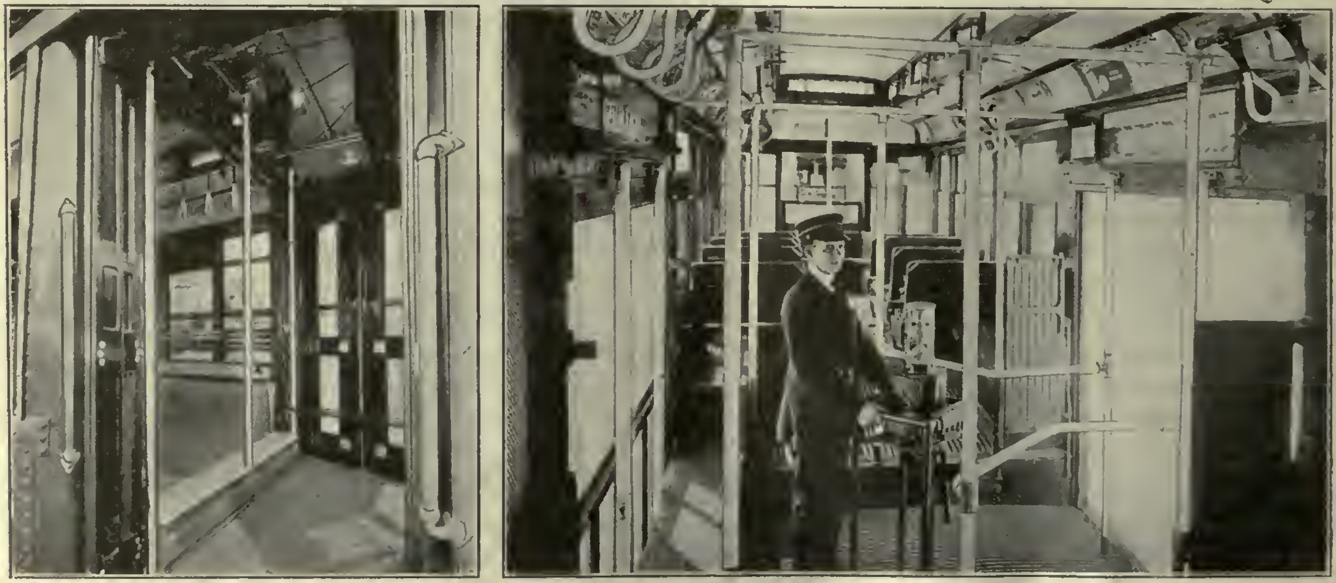
Now, while the Mazda lamp as a whole unit gives a degree of illumination which may not be considered excessive, nevertheless the filament itself is extremely brilliant, as is evidenced by the fact that we cannot look directly at the filament without instinctively turning away with our eyes smarting. It is desirable, therefore, that the lamp be shaded so that in an ordinary standing or sitting position the eye will not see the bare filament, and by so doing a less total amount of illumination is required for the reason before stated, that the pupil stays wider open. This cuts down the power consumption for illumination and is therefore desirable. The shading further permits us to use a smaller number of high-power lamps, thus reducing the first cost and the maintenance, and giving, if intelligently placed, equally satisfactory illumination.

PUSH BUTTONS MAY BE HIS LAST IMPRESSION

Our rider nears the end of his trip, and as he approaches his destination he desires to warn the car operator that he wants the car to stop. By and large, the obvious way for him to do it is by the convenient push button, one of the symbols of authority of which the American, native born or melting potted, is ever fond.

Starting out as an unmitigated nuisance, as it admittedly was in the old days of dry batteries and housebell wiring, it has evolved into a sturdy piece of apparatus that needs only a reasonable upkeep to have it render its service quietly and unobtrusively to the passenger, allowing him to leave the car with kindly feelings toward the company and its plea for a fairer show in the municipality in which he lives. Don't forget that last impressions are often controlling.

With a few steps the passenger is off the car and our responsibility toward him is ended. What a cycle of human interest it has been from the moment that his eyes scanned the horizon for his car until we let him off at his corner, bound for his home or his work. And the cycle repeats itself millions of times each day throughout the country. And on the skill with which the cycle is traversed depends the success or failure of our service.



At Left, a Clean and Roomy Entrance Invites Attention. At Right, White Enameled Stanchions and Hand Straps for the Comfort of Standing Passengers

Merchandising Is Different in Railroading than in Private Enterprises—To Determine What Constitutes Efficient Service, Traffic Surveys Are Made and All Runs Are Charted

Making Transportation Serve—and Sell

By Clinton E. Morgan

Assistant General Manager Brooklyn City Railroad Company

Borough Hall, Brooklyn, Showing Loop and How Study Has Resulted in Elimination of Congestion Due to a More Even Car Flow

IN THE USAGE of transportation the word "merchandising" conveys a meaning not wholly clear. From whatever angle we attack the question of transportation we are met by conditions not found in the ordinary forms of business, and which, therefore, do not lend themselves to the methods and policies therein employed.

Possibly it should be true that the principal problems of "selling" transportation do not differ greatly from the principal problems of the average merchant, but whether this be so or not the essential facts of the transportation industry unquestionably exclude "merchandising" when we attempt to apply this term to the business of running a street railway system.

It is plain that the street railway systems carry obligations and enjoy rights in a sense wholly distinct from those of merchandising. All this is true even of large corporations which are a collection of individuals as holders of stock.

This general view is put forth with the idea of dispelling any misconceptions that may arise from the use of the term "merchandising." It is the duty of railways to deal with conditions as they are, not as they have been or should be. It does not aid effective policies to deal loosely with terms that may lead both the public and the workers in the transportation industry astray.

In Brooklyn, where a situation scarcely without parallel in the country has existed, the obstacles to successful management have been greater than those faced by private enterprise, even in abnormal periods. Added to the difficulties resulting from resumption of independent operation and the disentanglement of the surface lines from the great network of transportation, involving subway and elevated systems, were new and indirect difficulties presented by a combination of municipal and private ownership.

The Brooklyn City Railroad, while under separate management and control, cannot be regarded for purposes of management or of public policy as distinct from the great network of transportation interests of which it forms a part. To make the situation still harder the management of these lines was confronted not only with the unusual troubles of an unusual traction situation but also by a hostile municipal administration. The management was even forced to resort to the courts to eliminate unfair bus competition and to be enabled to exercise its franchise rights.

Dealing with the question of merchandising Brooklyn's transportation in sense of marketing or, better still, providing service, we may pursue some lines of analogy between the storeman and the street railway operator in a discussion germane to the symposium which this number of the ELECTRIC RAILWAY JOURNAL embraces. The storeman relies to a great extent on direct advertising, and, while this method is followed in varying degrees by transportation systems, selling in Brooklyn is being accomplished by the indirect method.

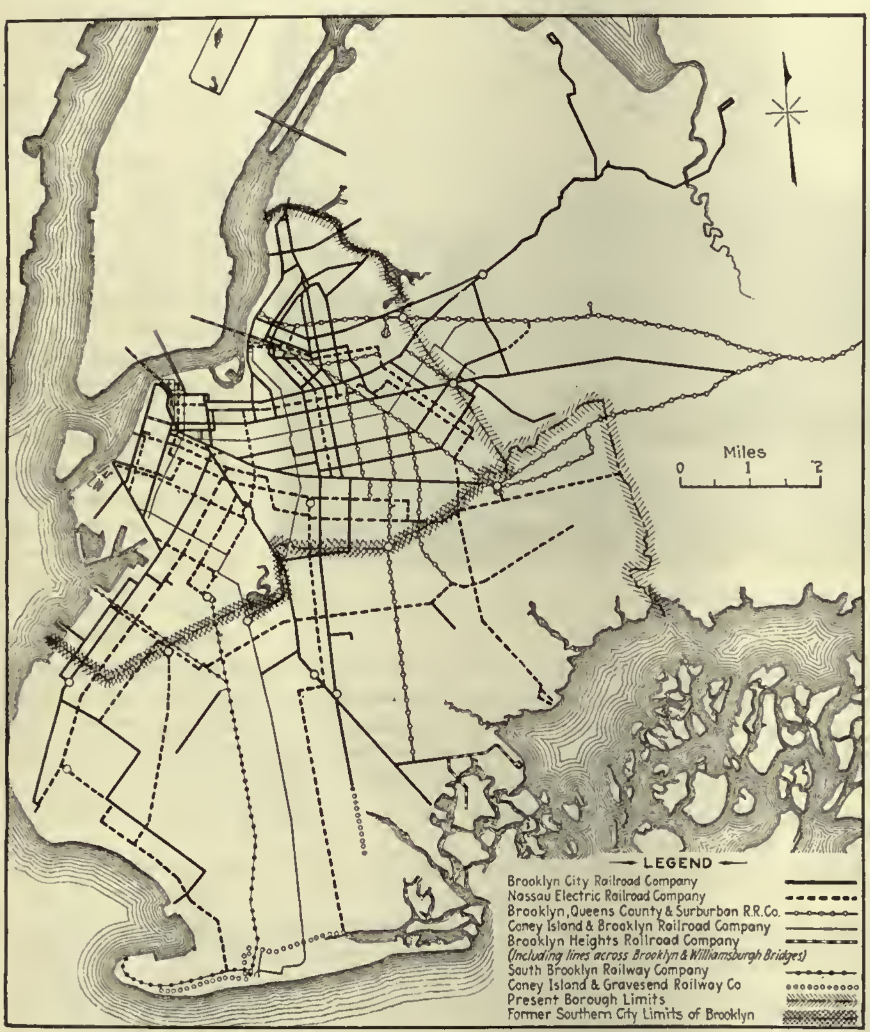
This policy is grounded on the belief that the first demand of the public is service and that when this service is supplied the result will be appropriate public acknowledgment with resultant increase in earn-

TABLE I—SUMMARY OF FOUR DAYS TRAFFIC CHECK, SHOWING OLD AND NEW RUNNING TIMES BETWEEN THE VARIOUS TIME POINTS

	April 16, 1921			April 17, 1921			April 19, 1921			April 20, 1921			Total	Average
	Number Trips	Total Time	Average Time	Number Trips	Total Time	Average Time	Number Trips	Total Time	Average Time	Number Trips	Total Time	Average Time	New	Old
Buffalo Avenue to Kingston........	14	62½	4½	6	27½	4½	12	54	4½	12	56	4¾	4½	6
Sterling Place....................	14	84½	6	6	32½	5½	12	52½	4½	12	51½	4¼	5	4½
Washington and Bergen...........	14	57½	4	6	29½	5	12	60	5	12	67	5¾	5	6½
Vanderbilt Avenue..............	14	31	2	5	14½	3	12	27½	2½	12	27½	2¼	2½	3
Flatbush-Atlantic................	14	49½	3½	5	15	3	12	38½	3	12	39	3	3¾	3
Livingston Street................	13	37	3	6	14½	2½	12	30	2½	12	32	2¾	2¾	1¾
Borough Hall.....................	13	86	6½	6	32	5½	12	71½	6	12	72	6	6	6½

ings and a better understanding on the part of the car rider, whose co-operation is essential to success.

In former days little thought was given to transportation in the nature of a sale. It was simply a case of putting what you had on the street and the public could ride or not. It was ample, however, when the companies were not required to seek business through the devices of the salesman. This attitude has made the problem more difficult, for the time when the public looks upon the advances of transportation companies without skepticism has not yet arrived. In Brooklyn, however, this skepticism is fading, but owing to the complications which an unfriendly city administration had produced, the general public still harbors doubt.


Miles
0
1
2
— LEGEND —
Brooklyn City Railroad Company
Nassau Electric Railroad Company
Brooklyn, Queens County & Surburban R.R.Co.
Coney Island & Brooklyn Railroad Company
Brooklyn Heights Railroad Company
(Including lines across Brooklyn & Williamsburgh Bridges)
South Brooklyn Railway Company
Coney Island & Gravesend Railway Co
Present Borough Limits
Former Southern City Limits of Brooklyn

Map of the 525 Miles of Surface Lines in Boroughs of Brooklyn and Queens

We believe that the transportation companies cannot reasonably ask the public for substantial support unless they give the equivalent of that support in adequate service. This attitude is based not upon altruism or upon any vague theory of rights but upon the fundamentals of an existing situation.

"Service" is difficult of definition. Service that is considered adequate for one property is entirely inadequate for another. This is true even as to lines on the same property. Efficient service must be built upon two prime factors—the attitude of the car riders and the economic cost of meeting that attitude. In Brooklyn the problem of the surface lines took definite and intensive form when the Brooklyn City Railroad, by decree of the federal court, was separated from the other surface and rapid transit lines operating in the borough and resumed independent operation, following the failure of the Brooklyn Heights Railroad to meet the obligations incurred as lessor. Since that time —Oct. 19, 1919—every effort has been made to maintain car service that would meet the requirements of the public. How successful these efforts have been is shown by the results flowing from unified operation of all the borough surface lines under one directing head. On Feb. 15, 1920, the receiver for the three other surface lines with which the Brooklyn City Railroad had formerly been associated as a part of the B. R. T. system entered into an agreement with H. Hobart Porter, vice-president and general manager of the Brooklyn City Railroad, to supervise for him operation of all the other surface lines of the Nassau Electric Railroad, the Brooklyn, Queens County & Suburban Railroad and the Coney Island & Brooklyn Railroad.

During the past year, notwithstanding the trainmen's strike in August, 1920, and the opening of the new rapid transit lines, which have greatly changed the traffic flow, the management has been able, by consistent application of a fixed policy, to study the traffic needs of each line separately and to handle more passengers at a lower cost per passenger than heretofore. Results have proved that this policy was sound, as the car riders have been given a quicker and better service.

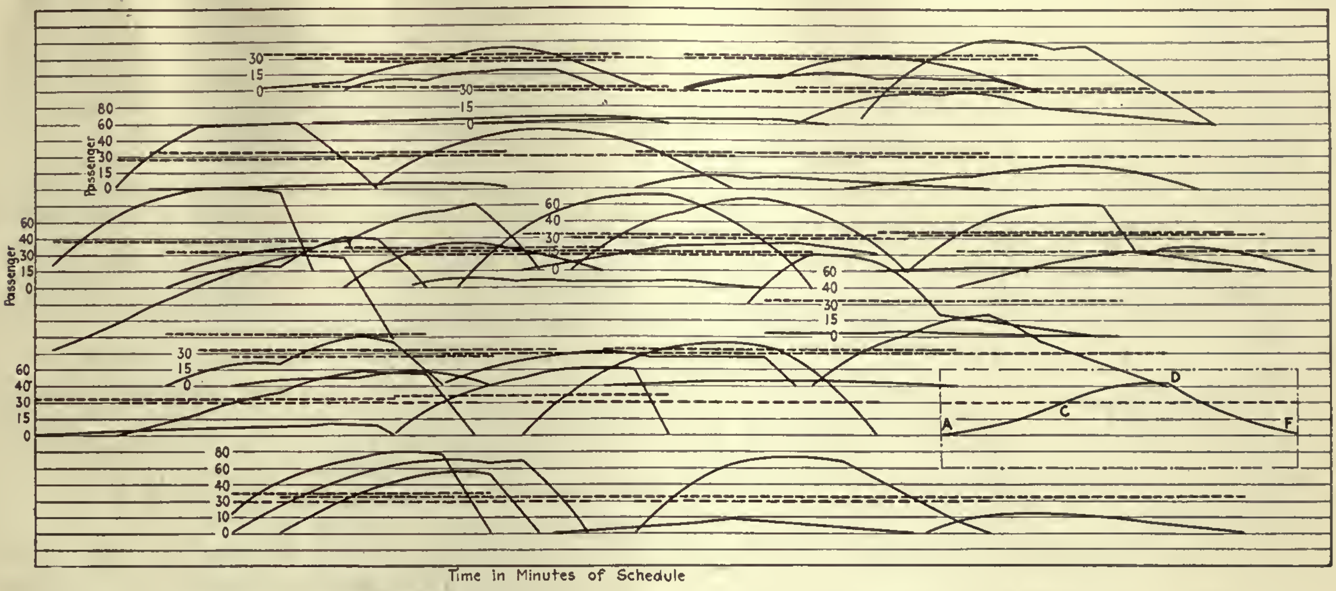
The surface lines of Brooklyn operate 524.887 miles of track and are owned and operated by seven companies as shown in table below.

Of the above, all except the Brooklyn City Railroad are controlled by the Brooklyn Rapid Transit Company's system.

Following the return of the Brooklyn City Railroad's property to its owners in 1919, and owing to the diversified ownership of the lines, it became necessary to break up several routes. The result was the forming of new riding habits by the public.

Soon after this changed condition of riding habit a thorough traffic survey was made of all surface lines. The object was to find where patrons were located, their riding habits, distance traveled, and, this ascertained, to adjust the service to their needs, with the view of determining the percentage of loading of the entire line. The further aim was to determine the methods used in the analysis, some of which are used generally throughout the country. In addition to these usual methods, and owing to the importance of complet-

	Miles of Track
The Brooklyn City Railroad....................	232.104
The Nassau Electric Railroad....................	146.409
The Coney Island & Brooklyn Railroad...........	52.488
The Brooklyn, Queens County & Suburban Railroad	64.956
The Brooklyn Heights Railroad..................	5.205
The South Brooklyn Railway....................	16.028
The Coney Island & Gravesend Railroad..........	7.697
Total mileage	524.887



Passenger Counts Plotted Graphically to Show Passengers on Cars at Each Five-Minute Interval in Comparison with Seating Capacity

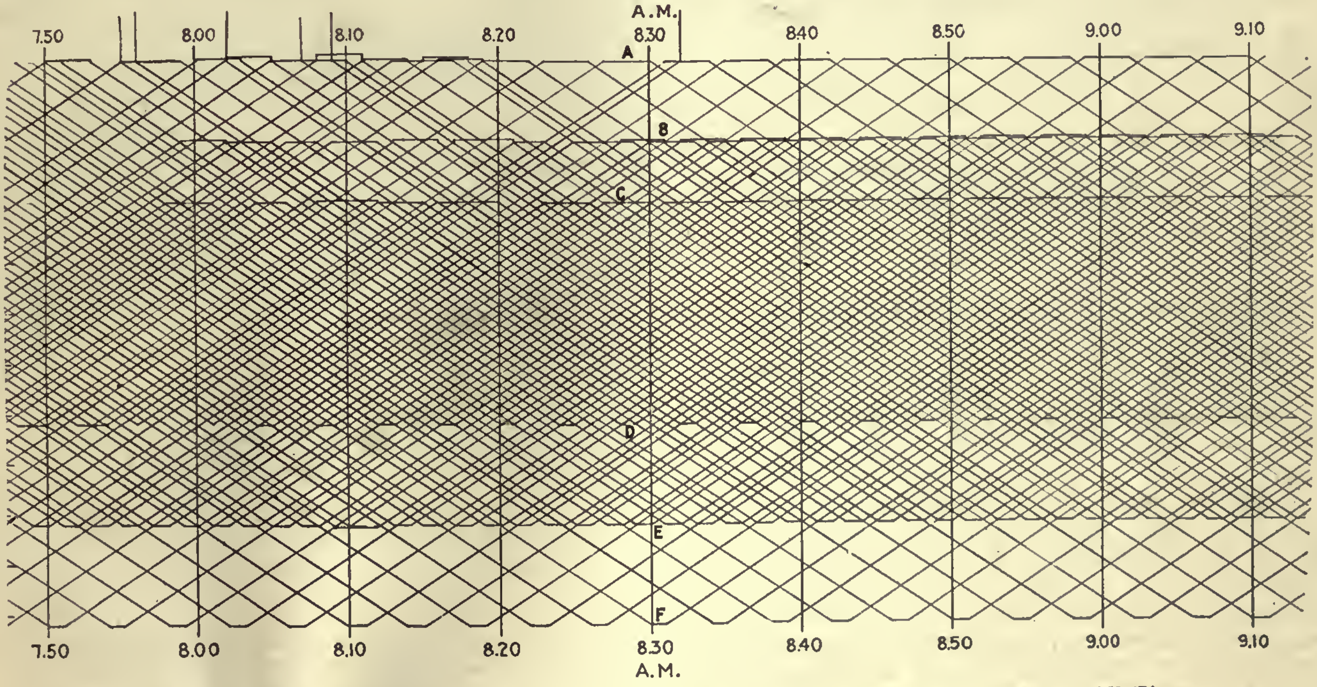
ing this survey at the earliest possible moment, many novel methods were and are now being employed to determine the necessary factors incident to providing the proper service in the most economical way.

In determining the service requirements, each line was checked from the beginning to the destination by stationing a trained checker at various points approximately five minutes from each other, regardless of distance. This virtually amounted to taking a cross-section analysis of the line. The men make a check of the line in both directions during the twenty-four hour period on the trunk lines, twenty-four hours per day, seven days per week, and on the lines of lesser travel from four to six days.

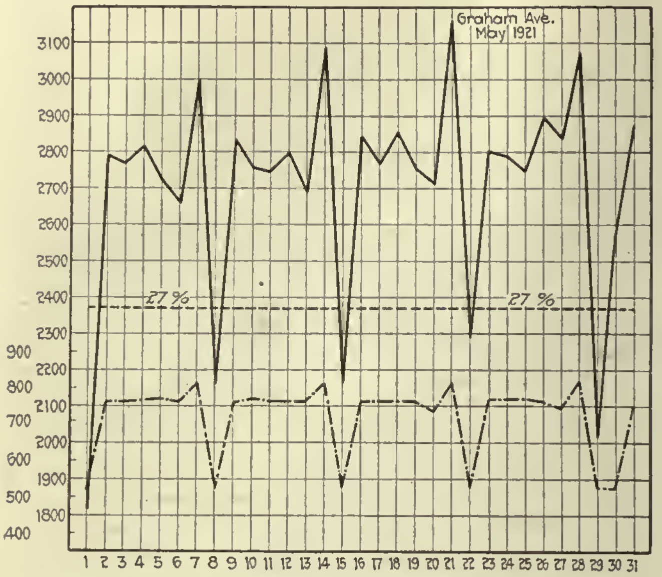
These passenger counts are then tabulated for the given line and are plotted graphically, together with the location points. From such calculations the various loading percentages in either direction on the entire line from 0 to 100 per cent are readily determinable.

While the checks are being made by checkers stationed five minutes apart, as explained, experienced operators and motormen are assigned to the line for the purpose of checking up the actual running time between any two time points for the various types of equipment, so that the correct running time can be incorporated in the contemplated schedule.

This enables us to make comparisons with similar traffic charts showing the number of seats at the same points. From these records it is easy to determine the exact loading of the lines, enabling the schedule department to build schedules to meet the requirements of the line by providing the maximum cars at the 100 per cent points, cutting back cars on either end of the line at points where the percentage of loading has correspondingly dropped.



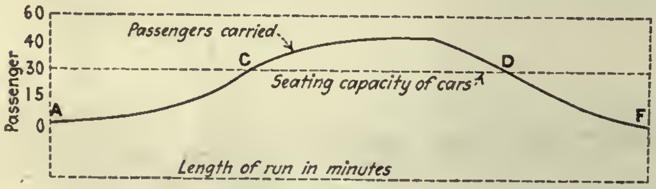
Graphical Analysis of a Schedule from Which the Movement of a Car Can Be Seen at All Times



Graphic Portrayal of Daily Car Revenues and Platform Costs for a Typical Route, Together with Semi-Monthly Percentage of Revenue Paid Out for Platform Labor. Used to Determine the Riding Pulse of the Community

The curves at top of page 501 give a series of these runs, the ordinates showing passengers carried and the abscissæ the length of run in minutes. Further, to illustrate the nature of these curves a curve showing a single run, *i.e.*, that inclosed in an insert in the lower right-hand corner of the curve referred to, has been enlarged and is reproduced below. In this run it will be seen that if a car as originally scheduled from point *A* to point *F* was operated between these points only, it would result in the operation of unwarranted service between points *A* and *C* and points *D* and *F*. These graphs enable the transportation department not only to determine the loading of a line but also the loading of each half trip. They also show where the turnbacks can profitably be established in order to facilitate handling the greatest number of people on the line with the most comfort.

After the schedule department has obtained these data, it can make up the schedules on standard A. E. R. A. forms, using as a basis the headway sheets.



Insert Enlarged Better to Show How Each Run Is Plotted

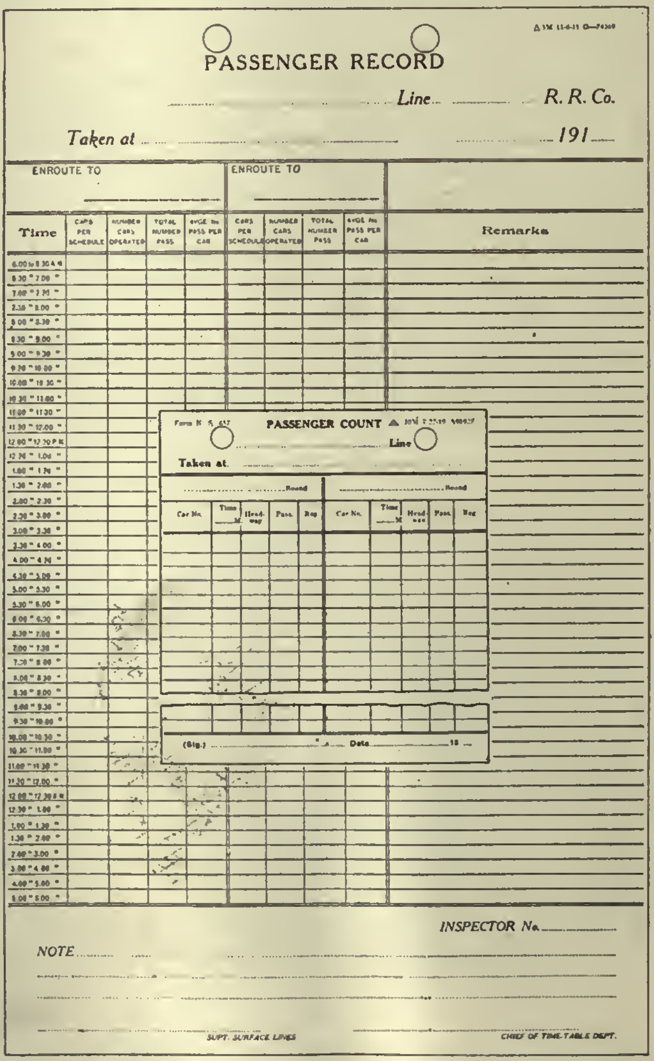
Before a schedule is put into effect it is laid out graphically, showing the movement of each car from the time it leaves the carhouse on its run until it pulls in, together with all layover time, and actual running time.

A portion of a graphic chart is illustrated on page 501. This graph is taken from a schedule of a typical line in Brooklyn and it shows that the service is turned back at six points, *i.e.*, it is a line with six terminals. The section shown is from the morning rush hour period of the complete chart, and it will be noted that the basic schedule is made up of through service from *A* to *F*. As the rush-hour riding tapers off, the short-line service operating between *C* and *D* as well as the service from *B* to *E* is dropped, leaving a through service during the non-rush hour period. This through service is likewise curtailed in line with the traffic requirements, being turned back at points *B*, *C*, *D* and *E*, in line with the decrease in riding.

In addition to enabling the operating department to provide the correct service, the plotting of these traffic studies, together with the schedules, is of material advantage to the operating company in the matter of complaints as to service, etc., from the public and regulatory bodies.

When several lines are routed over the same track for a part of their run, it is the custom to build the schedule for the joint trackage first in order to keep the cars spaced equally at all points where the greatest congestion occurs. This much of the schedule having been determined, the outlying schedules of each route are built to conform thereto.

When a schedule becomes effective, the line supervisory force and all of those connected with the direct operation of the line are schooled so that all are familiar with the schedule, it being the duty of the division operating force to operate the line in accordance with the schedule and enforce the discipline necessary to the observance of the schedule running time.



PASSENGER RECORD

.... Line .... R. R. Co.

Taken at .... 191...

ENROUTE TO					ENROUTE TO				
Time	Cars per Schedule	Number Cars Operated	Total Number Pass.	Avge. No. Pass. per Car	Cars per Schedule	Number Cars Operated	Total Number Pass.	Avge. No. Pass. per Car	Remarks
6.00 to 6.30 A. M.									
6.30 " 7.00 "									
7.00 " 7.30 "									
7.30 " 8.00 "									
8.00 " 8.30 "									
8.30 " 9.00 "									
9.00 " 9.30 "									
9.30 " 10.00 "									
10.00 " 10.30 "									
10.30 " 11.00 "									
11.00 " 11.30 "									
11.30 " 12.00 "									
12.00 " 12.30 P. M.									
12.30 " 1.00 "									
1.00 " 1.30 "									
1.30 " 2.00 "									
2.00 " 2.30 "									
2.30 " 3.00 "									
3.00 " 3.30 "									
3.30 " 4.00 "									
4.00 " 4.30 "									
4.30 " 5.00 "									
5.00 " 5.30 "									
5.30 " 6.00 "									
6.00 " 6.30 "									
6.30 " 7.00 "									
7.00 " 7.30 "									
7.30 " 8.00 "									
8.00 " 8.30 "									
8.30 " 9.00 "									
9.00 " 9.30 "									
9.30 " 10.00 "									
10.00 " 10.30 "									
10.30 " 11.00 "									
11.00 " 11.30 "									
11.30 " 12.00 "									
12.00 " 12.30 A. M.									
12.30 " 1.00 "									
1.00 " 1.30 "									
1.30 " 2.00 "									
2.00 " 3.00 "									
3.00 " 4.00 "									
4.00 " 5.00 "									
5.00 " 6.00 "									

PASSENGER COUNT

.... Line

Taken at ....

.... Bound					.... Bound				
Car No.	Time ......M	Headway	Pass.	Reg.	Car No.	Time ......M	Headway	Pass.	Reg.

(Sig.) .... Date .... 19...

INSPECTOR No. ....

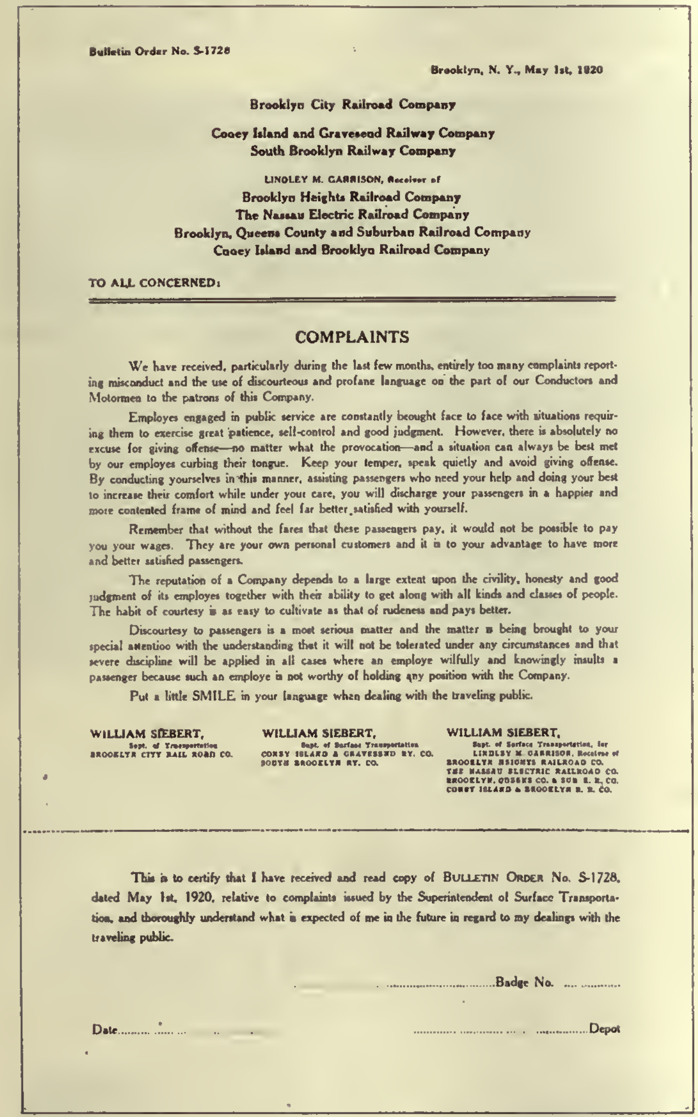
NOTE ....

SUPT. SURFACE LINES

CHIEF OF TIME TABLE DEPT.

Summary Record Sheet for Tabulating Individual Counts. Insert—Form Used by Individual Traffic Checkers in Making Passenger Counts at Five-Minute Schedule Intervals

The schedule being technically correct and providing for accurate spacing, the next important item is to maintain the operation and spacing as called for in the schedule, as the proper spacing results in the selling of the transportation to the respective rider on sight, particularly when the cars are operated on a frequent headway. When a car rider observes a car approaching in the near distance he will unhesitatingly wait for it, but when there is no car in sight the result in many cases is the loss of the passenger. Particularly is this true if the destination of the passenger is within a comparatively short distance. The traffic surveys referred to enable the transportation department to determine the frequency of the headway. In any case it is of the utmost importance to keep the cars of any route properly spaced, without which an unbalanced loading condition and operation of unprofitable mileage ensues.



Bulletin Order No. S-1728

Brooklyn, N. Y., May 1st, 1920

Brooklyn City Railroad Company

Coney Island and Gravesend Railway Company
South Brooklyn Railway Company

LINDLEY M. GARRISON, Receiver of
Brooklyn Heights Railroad Company
The Nassau Electric Railroad Company
Brooklyn, Queens County and Suburban Railroad Company
Coney Island and Brooklyn Railroad Company

TO ALL CONCERNED:

COMPLAINTS

We have received, particularly during the last few months, entirely too many complaints reporting misconduct and the use of discourteous and profane language on the part of our Conductors and Motormen to the patrons of this Company.

Employes engaged in public service are constantly brought face to face with situations requiring them to exercise great patience, self-control and good judgment. However, there is absolutely no excuse for giving offense—no matter what the provocation—and a situation can always be best met by our employes curbing their tongue. Keep your temper, speak quietly and avoid giving offense. By conducting yourselves in this manner, assisting passengers who need your help and doing your best to increase their comfort while under your care, you will discharge your passengers in a happier and more contented frame of mind and feel far better satisfied with yourself.

Remember that without the fares that these passengers pay, it would not be possible to pay you your wages. They are your own personal customers and it is to your advantage to have more and better satisfied passengers.

The reputation of a Company depends to a large extent upon the civility, honesty and good judgment of its employes together with their ability to get along with all kinds and classes of people. The habit of courtesy is as easy to cultivate as that of rudeness and pays better.

Discourtesy to passengers is a most serious matter and the matter is being brought to your special attention with the understanding that it will not be tolerated under any circumstances and that severe discipline will be applied in all cases where an employe wilfully and knowingly insults a passenger because such an employe is not worthy of holding any position with the Company.

Put a little SMILE in your language when dealing with the traveling public.

WILLIAM SIEBERT,
Supt. of Transportation
BROOKLYN CITY RAIL ROAD CO.

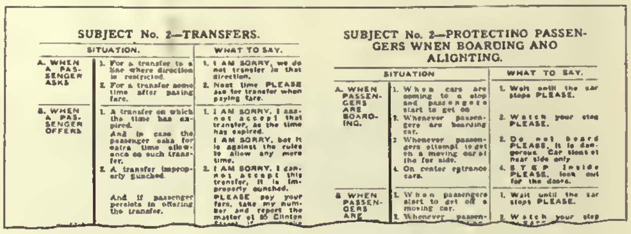
WILLIAM SIEBERT,
Supt. of Surface Transportation
CONEY ISLAND & GRAVESEND RY. CO.
SOUTH BROOKLYN RY. CO.

WILLIAM SIEBERT,
Supt. of Surface Transportation, for
LINDLEY M. GARRISON, Receiver of
BROOKLYN HEIGHTS RAILROAD CO.
THE NASSAU ELECTRIC RAILROAD CO.
BROOKLYN, QUEENS CO. & SUB. R. R. CO.
CONEY ISLAND & BROOKLYN R. R. CO.

This is to certify that I have received and read copy of BULLETIN ORDER No. S-1728, dated May 1st, 1920, relative to complaints issued by the Superintendent of Surface Transportation, and thoroughly understand what is expected of me in the future in regard to my dealings with the traveling public.

..............................Badge No. ....

Date.............................. ....Depot

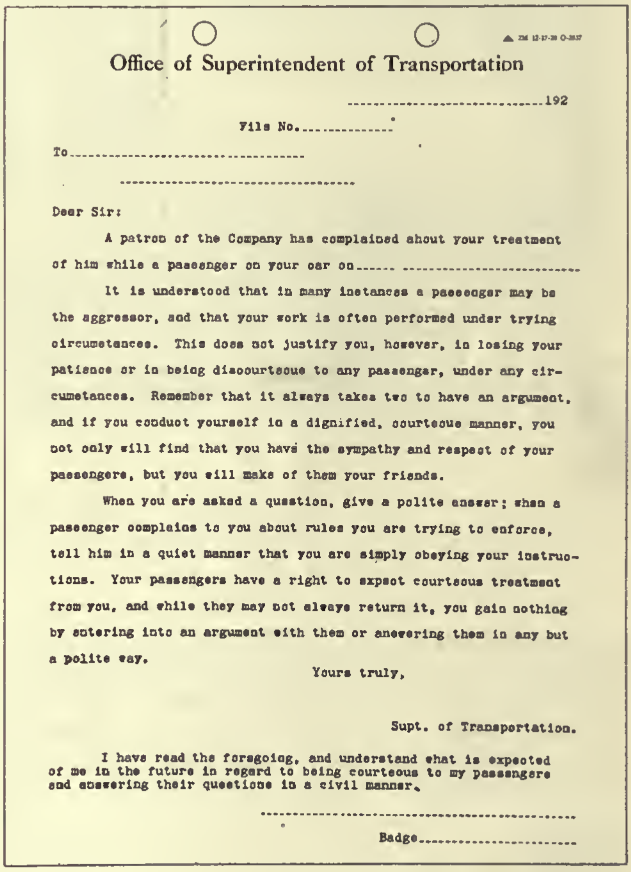


SUBJECT No. 2—TRANSFERS.

SITUATION.		WHAT TO SAY.
A. WHEN A PASSENGER ASKS	1. For a transfer to a line where direction is restricted.	1. I AM SORRY, we do not transfer in that direction.
	2. For a transfer some time after paying fare.	2. Next time PLEASE ask for transfer when paying fare.
B. WHEN A PASSENGER OFFERS	1. A transfer on which the time has expired.	1. I AM SORRY, I cannot accept that transfer, as the time has expired.
	And in case the passenger asks for extra time allowance on such transfer.	I AM SORRY, but it is against the rules to allow any more time.
	2. A transfer improperly punched.	2. I AM SORRY, I cannot accept this transfer, it is improperly punched.
	And if passenger persists in offering the transfer.	PLEASE pay your fare, take my number and report the matter at 85 Clinton

SUBJECT No. 2—PROTECTING PASSENGERS WHEN BOARDING AND ALIGHTING.

SITUATION		WHAT TO SAY.
A. WHEN PASSENGERS ARE BOARDING.	1. When cars are coming to a stop and passengers start to get on	1. Wait until the car stops PLEASE.
	2. Whenever passengers are boarding car.	2. Watch your step PLEASE.
	3. Whenever passengers attempt to get on a moving car at the far side.	3. Do not board PLEASE, it is dangerous. Car stops at near side only
	4. On center entrance cars.	4. STEP inside PLEASE, look out for the doors.
B. WHEN PASSENGERS ARE	1. When passengers start to get off a moving car.	1. Wait until the car stops PLEASE.
	2. Whenever passen-	2. Watch your step



▲ 2M 12-17-20 O-2837

Office of Superintendent of Transportation

..............................192

File No...............

To..............................

....

Dear Sir:

A patron of the Company has complained about your treatment of him while a passenger on your car on...... ....

It is understood that in many instances a passenger may be the aggressor, and that your work is often performed under trying circumstances. This does not justify you, however, in losing your patience or in being discourteous to any passenger, under any circumstances. Remember that it always takes two to have an argument, and if you conduct yourself in a dignified, courteous manner, you not only will find that you have the sympathy and respect of your passengers, but you will make of them your friends.

When you are asked a question, give a polite answer; when a passenger complains to you about rules you are trying to enforce, tell him in a quiet manner that you are simply obeying your instructions. Your passengers have a right to expect courteous treatment from you, and while they may not always return it, you gain nothing by entering into an argument with them or answering them in any but a polite way.

Yours truly,

Supt. of Transportation.

I have read the foregoing, and understand what is expected of me in the future in regard to being courteous to my passengers and answering their questions in a civil manner.

....

Badge..............................

Forms Used in Schooling Trainmen. At Left, Bulletin Notice Relative to Complaints. At Top, Right—Pages from Trainmen's Courtesy Code. At Bottom, Right—Form Letter to Individual Trainmen Used When Personal Complaints Are Made of Their Action

Delays, rerouting, cut-backs, turn-backs and pull-ins are all reported to the office of the superintendent of transportation, who thus can correct any irregularities.

Shortly after midnight the carhouse clerks tabulate the conductors' remittances for each line, reporting to the superintendent's office the gross revenue per line for the day, together with the platform cost for service rendered on such line. The superintendent's office compiles such figures for all lines operated, making a report each morning, which is placed in the hands of the superintendent and the management by 9 o'clock, showing the total gross revenue and platform cost for the preceding day by lines, as well as by depots or carhouses.

From this statement the revenue and platform cost are plotted graphically for each line as illustrated on page 502 with percentage ratio of the two plotted each half month.

Coincident with the plotting of the platform cost, such costs are checked with the scheduled allowance to determine their correctness and checkmate any unauthorized service being operated or the failure of any division to operate the schedule as provided. Other reports made to the superintendent of transportation show any discrepancies in or additions to the authorized schedules and their reasons therefor.

Having the reports covering the preceding day's operation early in the morning the management is able

TABLE II—METHOD OF TABULATING TIME CHECKS ON ST. JOHN'S PLACE ROUTE TO DETERMINE THE ACTUAL RUNNING TIME BETWEEN FIXED POINTS

Car Number	Buffalo Ave.	Kingston	Sterling and Rogers	Washington and Bergen	Vanderbilt Ave.	Flatbush and Atlantic	Livingston and Flatbush	Borough Hall	Date	Total Time
5092	4	6	3½	2½	4	2	5	0	.	27
5075	5	8	5	2	4	1	7	0	..	32
4589	4½	5½	4	2	4	3	5	0	..	28
4597	5	6	4	2	4	3	6	0	..	30
4593	5	6	4	2	3½	2½	6	0	4	29
5092	5	7	3½	2	3	3	5½	0	..	29
4589	5	5	4	2	4	3	5	0	16	28
5072	5	5	4	2½	3½	2	7	0	..	29
4594	4	6	4	2	3	3	6	0	20	28
4597	4	6	4	2	3	3	9	0	..	31
4588	4	6	3½	3	3½	3	7	0	..	30
4593	4	3½	3½	3	3	2½	8½	0	..	28
5081	4	7½	4½	2	3	4	9	0	..	34
3139	4	7	6	2	4	...	...	.	..	23
Total......	62½	84½	57½	31	49½	37	86	0	..	408
Average....	4½	6	4	2	3½	3	6½	0	..	....
5088	4	7	4	3	3	3	5	0	4	29
4598	5	7	5	3	3	2	6	0	..	31
4591	4	5	4	...	...	3	5	0	17	21
5077	4½	4½	5½	2½	3	2	5	0	..	27
5090	5	4	5	3	3	2½	5	0	20	27½
5083	5	5	6	3	3	2	6	0	..	30
Total......	27½	32½	29½	14½	15	14½	32	0	..	165½
Average.....	4½	5½	5	3	3	2½	5½	..	..	....
4582	4	4	4	2	4	2	4	0	..	24
4595	5	5	5	2	4	3	6	0	..	30
4581	5	4	4	3	3	3	6	0	..	28
5082	4	5	6	2	3	2	5	0	4	27
4591	4	4	5	2	4	2	5	0	..	26
5075	4	5	6	2	2	2	6	0	19	27
5086	5	4½	5	3	3	2	6	0	..	28½
5072	4½	4	5	3	4	2	7	0	20	29½
5092	4½	4	5	2	4	3	6	0	..	28½
4579	5	4	4½	1½	2	3	7	0	..	27
4588	4	4½	5	2	2½	3	6	0	..	27
4593	5	4½	5½	3	3	3	7½	0	..	31½
Total......	54	52½	60	27½	38½	30	71½	..	..	334
Average....	4½	4½	5	2½	3	2½	6	..	..	....
5086	5	4½	5½	2½	3½	3	5	0	..	29
4588	5	4	6	2	3	2	7	0	..	29
4591	4	4	5	2	3	3	5	0	4	26
4579	4½	4	5½	3	3	2	6	0	..	28
5088	4½	4	5	2½	3	3	6	0	20	28
5086	5	5	6½	2	3	2½	6½	0	..	30½
4591	4½	3½	5	2½	3½	3	6	0	20	28
4597	4½	4½	5½	2	3½	2	6	0	..	28
4586	4	4	6	2½	3½	3	5	0	..	28
4584	6	4	5½	2	3½	3	6½	0	..	30½
4597	5	5	5½	2½	3	3	6	0	..	30
5073	4	5	6	2	3½	3	7	0	..	30½
Total......	56	51½	67	27½	39	32½	72	0	..	345½
Average....	4½	4½	5½	2½	3	2½	6	..	..	....

to analyze the operation of each individual line and to make changes in the succeeding day's operations. Any immediate necessity for changing the schedule or rerouting to improve the net result is also immediately evident from an analysis of the daily curves plotted from these reports.

In addition to the statements and graphic charts described, tables are prepared covering individual lines and showing by months the gross revenue, platform cost, car mileage and passengers carried, together with the increase or decrease over the previous year and the percentage thereof.

To arrive at the earnings per car-mile for the various types of equipment, the expenses are allocated on the car-mileage basis for the equipment on the specified line. Thus the cost per car-mile for such line can be determined with reasonably accuracy. Inasmuch as the reports give the revenue by line, it is easy, through this method, to determine at once whether or not the specific line is actually meeting its proper proportion of the expenses.

With these data at hand, the management is able to keep its finger on the "riding pulse" of the community and the service rendered and to change the schedules to meet changing conditions without waiting to secure more detailed information from actual figures submitted later by the accounting department.

In conjunction with this method of analyzing transportation, the conductor and motormen, dealing direct with the public, must be taken into account as the salesmen employed in the direct marketing of this transportation. They are being schooled continuously in politeness and courtesy so they will attract patronage and rid street car transportation from irritating disturbances and avoidable delays. In this connection the salesmen for the street car company may be likened to the salesmen for almost any concern or business which is endeavoring to place its wares before the buyer. But there is this difference: Instead of spasmodic visits, as in the case of the commercial salesman, successful transportation requires the establishment of a frequent service, so that the customers—the riders—are approached with never ceasing regularity; the service being in charge of polite and courteous salesmen, the conductors and motormen.

"Merchandising Transportation" in this sense does not mean simply running a given number of cars, nor a certain number of car-miles, nor even furnishing a given number of seat-miles on a given line. Rather, as described, it involves the policy of first ascertaining the transportation needs of the patrons and then giving them the best possible service at a minimum cost. It is this policy and these ends which are fundamental in keeping transportation "sold" and inviting new customers.

Left, Flatbush Avenue Looking Toward Prospect Park. Right, View on DeKalb Avenue, Where the Heaviest Surface Car Line Is Operated. Rush-Hour Schedules Call for Headways of Less Than Sixty Seconds

What Some of the Interurban Railways of the Middle West Are Doing This Year to Stimulate Traffic—Earnings Holding Up Well

Soliciting and Advertising For Freight and Passenger Traffic

By "Observer"

Illinois Traction System Booth Maintained at the State Fair as the Official Information Bureau

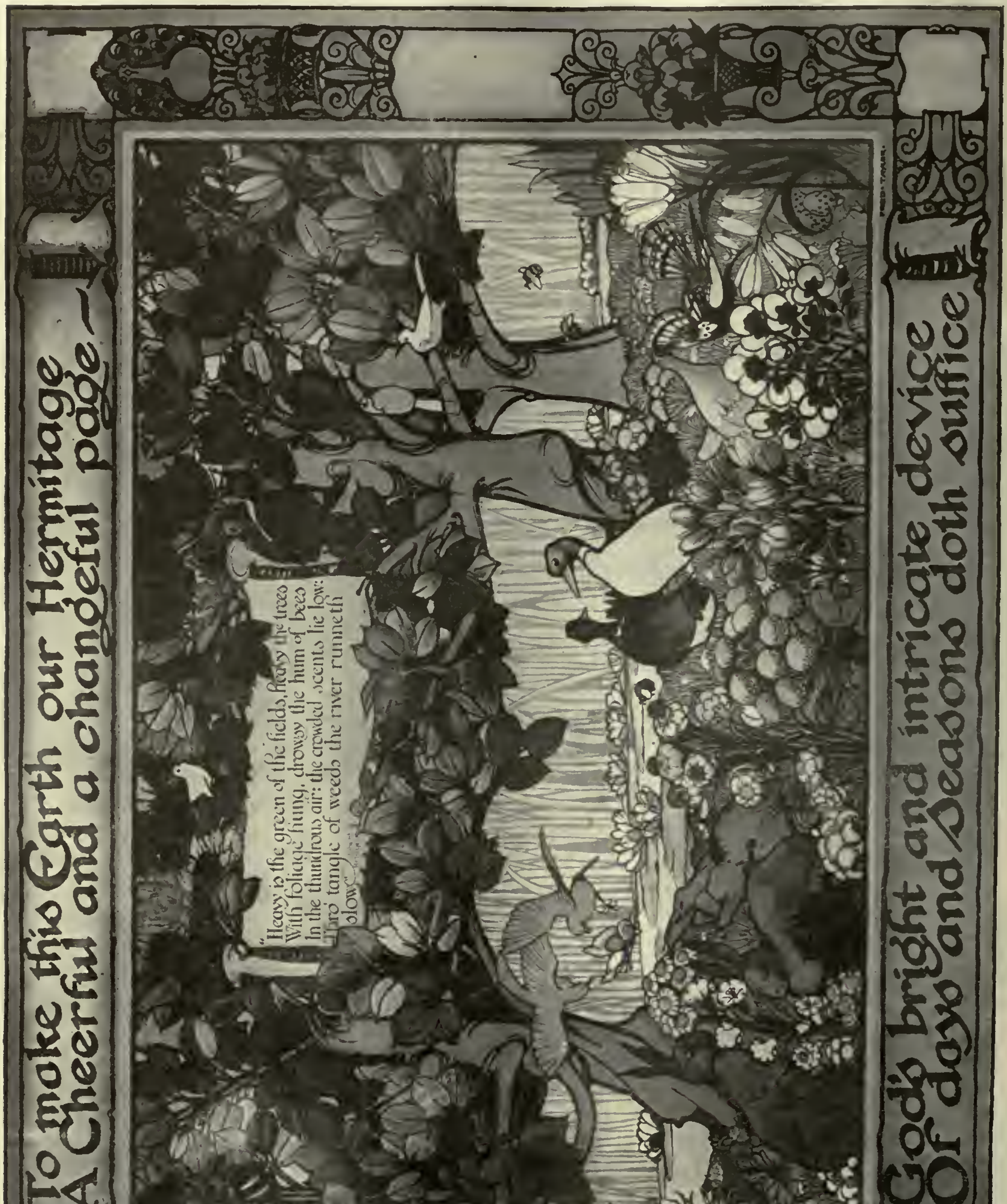
"FIGHTING for business" about expresses what is being done this year by those interurban railways in the Middle West which are showing gross earnings approximately equal to or better than last year. It is notable that the success of these companies, in contrast to the showing of some of the others that have experienced a rather discouraging falling off in revenue, is attributable in good measure to the greatly increased and persistent sales activities of the management and traffic and advertising departments. In other words, business has been sustained almost by main strength. Falling off in riding of regular travelers has been offset by stimulating more casual riding and by going strongly after the transportation of convention parties and all other kinds of group movements.

In general, more solicitation and more intensive solicitation, more advertising, better service and more attractions in the way of excursions, etc., are the things that have been done to hold up the earnings in the face of general business depression. And with it all is probably a better understanding of the need of and ways to merchandise electric railway transportation. Undoubtedly, also, the competition of the steam railroads and motor buses and trucks has served as a spur to increased effort on the part of traffic men.

The following survey of some features of what some of the electric railways of the Middle West are doing to attract and create traffic for their lines may contain ideas that can be used to advantage elsewhere.

One of the best sources of freight traffic for the Illinois Traction System this year, according to C. F. Handshy, general manager, has been the road-building program in which the State is engaged. The company works closely with the contractors and the materials supply dealers, and by virtue of this has thus far been able to get a very large proportion of the hauling of road materials for hard roads built parallel to or in the vicinity of the traction system. Hard roads under construction, contracted for or planned for the near future parallel the lines of the Illinois Traction System between St. Louis and Springfield, Springfield and Decatur, Springfield and Peoria, Bloomington and Decatur, and Decatur and Danville. For example, the mileage of the Illinois Traction System between Springfield and St. Louis is 99.1 miles, while contracts have been issued for 89.71 miles of hard road between these two points. For this construction work the Illinois Traction System will haul fully 75 per cent of the materials used.

The volume of traffic which this extensive construction program means may be realized when it is considered that 1 mile of the Illinois standard 18-ft. concrete road requires approximately twenty-two carloads of sand, thirty-six cars of gravel, seventeen cars of cement and one carload of reinforcing steel. In addition, the contractor's receiving station and much of the equipment must be moved once for about every 8 miles of road built, each such move meaning a special freight job for the traction company. At each point where the contractor makes a set-up or receiving station the railway installs a siding with a capacity for about twelve cars. The railway furnishes and claims the


To make this Earth our Hermitage
A Cheerful and a changeful page—
"Heavy is the green of the fields, heavy the trees
With foliage hung, drowsy the hum of bees
In the thundrous air: the crowded scents lie low:
Thro' tangle of weeds the river runneth slow."
God's bright and intricate device
Of days and seasons doth suffice

Publicity Leadership—The Original of This Illustration Is a 38 In. x 60 In. Poster, in Varied and Brilliant Colors—A Real Work of Art—It Is a Sample of What Is Used by the London Underground to Set the Tone of Poster Advertising at Its Stations—a Tone the Company Is Careful to Maintain in All of Its Own Posters material used in the siding, but the contractor pays the cost of putting it in and taking it out.

Thus, while the Illinois Traction System anticipates that the hard roads will take away a certain amount of the short-haul riders, it is making the most of the situation by securing the business of hauling the necessary materials. The main interurban lines of the Illinois Traction System comprise 418 miles of connected line, paralleling which there is probably in the neighborhood of 200 miles of concrete road for which the Traction System has secured or will secure the haulage of materials.

The freight revenue of the I. T. S. is now approximately one-third of the total revenue of the interurban system. Of this, approximately one-half is derived from hauling coal originating at mines served by the company. The efforts of the traffic department during the past year have been largely directed to increasing the tonnage that can be handled profitably. This has included the establishment of new industries along the electric lines which may be expected to produce traffic for years to come, the continuance of overnight service for merchandise and important carload freight, a considerable broadening of the tariff arrangement all around, enabling the company to inaugurate joint rates with over 300 steam railroads and to quote through rates into practically all parts of the country, and the consummation of a physical connection with the Illinois Terminal Railroad at Edwardsville, Ill. The last named meant an amount of business such that the total expense of making the connection was paid off the first month. Altogether, the railway now has about 200 industries on its 418 miles of interurban line. Many of these are grain elevators and coal mines.

I. T. S. ADVERTISING FOR TRAFFIC

The use of billboard and novelty advertising on the part of the Illinois Traction System has been largely discontinued, but the use of newspapers, which are considered the best medium for reaching the public, has been continued at the rate of about $1,500 a month. Approximately 200 daily and weekly newspapers are used regularly, of which 171 have contracts with the traction company by which space is exchanged for transportation. This space is used largely to advertise excursions and now and then for general good will publicity. One of the most successful of these excursions was a Saturday-Sunday-Monday-Decoration Day excursion. The three-day limit and the rate of one and one-quarter times the single fare proved very popular and attracted over 4,000 people to make the trip between St. Louis and Springfield, Ill. The same kind of an excursion permitting people to go on Saturday and Sunday and return Monday was provided over Labor Day, and this was likewise successful. In addition to the newspaper advertising, these excursions are advertised by slides in the motion picture theaters and by fliers in the cars and in the stations and stores around the various towns. In contrast with these three-day excursions, the Sunday excursions conducted during the past summer between Springfield and St. Louis for a rate of one and one-half the regular one-way fare have not proved very successful.

St. Louis baseball games are featured frequently in the advertising copy of the Traction System and this has proved to be a good drawing card. A recent contest inaugurated by E. E. Soules, publicity manager, offering prizes for the best 200-word letters telling why the Illinois Traction System is "the best way to the best State fair," resulted in a large amount of exceedingly favorable newspaper publicity. There were 571 entries in the contest, and the newspapers in all the towns along the system took considerable interest in the contest and gave a good deal of space to it, often front-page space. In addition, of course, the traction company advertised the contest in the daily papers and then capitalized on the winning letters for further complimentary copy about the traction company. In addition to the five prizes awarded, the company acknowledged the letters of all other entries who had taken the trouble to write letters saying nice things about the company, by sending them a friendly letter and a deck of Traction Playing Cards or a railroad map of Illinois, which have been much in demand. This is believed to have aided in creating a good feeling among the many contestants, as indicated by the number of thank you letters.

A new feature of publicity recently started is a neat folder timetable printed monthly which has all tables on one side when unfolded. On the opposite side are a few pictures of freight and passenger equipment, a map of the system, list of company officials, general information and two columns of "news note" in which are given notices of various coming events to take place at points on the system, items of interest about cities along the line, some general good will matter, etc.

An especially effective piece of advertising run during the year was a full page of pictures with interesting captions in the rotogravure section of a Peoria Sunday newspaper. This portrayed many features of the Traction System and appeared as editorial matter rather than as advertising. Special pictures were secured for this and it made a very attractive page.

The great value of motion picture advertising is not being overlooked by the I. T. S. During the past summer a series of seven travelogue films ranging in length from 55 ft. to 63 ft. have been shown in fifteen motion picture theaters in St. Louis, which is the only city on the system where satisfactory distribution can be obtained. These films are of a strictly advertising nature and they appear under the common heading of "Evelyn's Traction Log." The main points designed to be brought out in these seven films are frequency of service, location of the interurban terminal in St. Louis, the block signals, the McKinley bridge, the parlor cars, picnic travel and the sleeper service. The films are run in that order, changing to the next in sequence each week.

The motion picture series is run in each house several times over during the summer. Each film gives a short, interesting sketch wherein Evelyn, an actress, brings out the feature of the traction line forming the subject of that film. The total cost of this advertising, including the making of the films and their distribution and display in the fifteen theaters from May to September, is $250 a month. The publicity department is now working on a film for advertising the freight facilities of the company to be shown before various business associations and civic organizations.

Another advertising scheme of the Illinois Traction System which costs little and has proved quite effective is the operation at the Illinois State Fair each year at Springfield of a booth which the fair authorities designate as the official information booth. Several attendants are stationed there to make sleeping or parlor car reservations, follow up any freight prospects, explain the signal exhibit, distribute such souvenirs as traction postcards, blotters, fans, maps, etc., and to answer the thousand and one questions that are asked. This year the publicity department kept a record of the questions asked for one day and made up a story based on this to which a number of the newspapers gave prominent space, one of them under the heading "Is It Any Wonder I. T. S. Man Grows Gray Hair Overnight?"

NEWSPAPER COUPON SCHEME ATTRACTS TRAFFIC

Richards Breckinridge, general freight and passenger agent Aurora, Elgin & Chicago Railroad, when interviewed as to what he had done to improve traffic, said: "The only thing I can think of is making my force work their heads off and even participating to some extent myself." However, the A., E. & C. is showing an increase in revenue over last year so far this year. This may be partially explained in what follows and by the spirit of intense work indicated in Mr. Breckinridge's jocular remark. He is having success again this summer in attracting excursion business through the co-operation of one of Chicago's evening newspapers. An excursion from Chicago to Glenwood Park, 39 miles distant, was run four business days one week and five business days the following week at the end of August at a special fare of 75 cents and war tax, one way, as compared with the regular rate of $1, which could be secured by presenting at the newspaper office a series of coupons from six issues of the paper. The newspaper received the coupons and sold the tickets, which were good only for the dates issued and on the special train. The railway then simply billed the newspaper for the number of passengers hauled on each excursion. About 400 people a day made the trip to Glenwood Park. Mr. Breckinridge is convinced that newspaper advertising is the greatest producer of traffic of any form of advertising.

While business on a great many interurban lines has fallen off very sharply, both passenger and freight, that of the Chicago, North Shore & Milwaukeee Railroad has held up remarkably well. Britton I. Budd, president, explains that this is not particularly because there is any improvement in business, but rather that the company has been doing more soliciting for business. The number of passengers is only slightly under what it was last year, but the revenue is equal to last year due to an increase in the long-haul riding and a slight increase in fare which evened up the intra- and interstate rates.

For a time the merchandise dispatch business of the company fell off very greatly, but is now back practically equal to last year. This does not mean that the individual shippers are forwarding anywhere near as much tonnage, but it means that the number of customers patronizing the road has been doubled and nearly trebled. The best part of this is that having won all these new customers, when business picks up the railway seemingly should hold them all and the problem will not be to get business but to know how to handle what is offered.

SOURCES OF PASSENGER TRAFFIC

Practically 100 per cent of the travel of theatrical people between Milwaukee and Chicago, amounting to an average of fifty fares a week in each direction, is secured by the Chicago, North Shore & Milwaukee Railroad. This is accomplished through personal solicitation of the business each week and through special service which the electric line supplies. This consists of an arrangement whereby all of the baggage of each "act" is checked directly from the theater in one city to the destination theater in the other city. A special baggage car is run each way every Sunday night so that the baggage is received after the last performance Sunday evening and delivered to the stage of the destination theater early the following morning. The transfer man at the receiving end collects from the "act," while the transfer man at the destination end collects from the stage manager. This service has included the handling of various kinds of stage animals, including horses and elephants, etc., which are loaded into the baggage car at the Congress Street station, just off the downtown loop, of the elevated railways in Chicago, where a large capacity elevator is available.

EXCELLENT RECORD BRINGS PRAISE

Not only is the transportation of the theatrical people secured when the troupes are changing from Milwaukee to Chicago bookings, and vice versa, but also when they are moving from Milwaukee to points requiring a transfer to other lines in Chicago. The electric line has made such an excellent record in serving these people and making special arrangements to make connections with outbound trains from Chicago that the theatrical people are universally enthusiastic for the North Shore Line and are constantly giving the line a good word in their travels.

This through checking of baggage from point of origination to destination points, as used for the theatrical people, is also available for the general public. An arrangement has been in operation for some time with the Commonwealth Checking Company, Chicago, and Milwaukee Transfer Company whereby they make use of three coupon checks, covering the records of the transfer company at either end and the electric line between cities. The originating transfer company collects for the transfer charges at both ends of the railway.

That this checking convenience is bringing a good deal of patronage to the company can perhaps be shown by the fact that the number of pieces of baggage handled by the North Shore Line this year as compared to last has increased nearly 600 per cent. Baggage is carried on nine trains a day each way. In other words, traveling men can leave either terminal city at almost any time of the day and have their baggage checked from a Milwaukee hotel to a Chicago hotel and travel on the same train that they do. This is bringing the business of a large proportion of the traveling salesmen to the electric line.

Considerable patronage for the North Shore Line has been assured through the sale of twenty-five ride tickets and 1,000-mile books by the traffic department to large concerns which have salesmen and representatives traveling between Milwaukee and Chicago frequently. A firm having many men traveling makes a good saving by this means, as the rate by ticket or mileage book is 2½ cents per mile as against the regular rate of 3 cents a mile. Consequently, a large number of these special rate books and tickets have been sold by representatives of the traffic department. A campaign put on to sell this form of transportation this summer resulted in more transportation of this kind being sold in one month than had been sold in the entire year of 1920. While this plan reduces the revenue received from the passenger riding on the lower rate, it insures his riding the electric line every trip for some time to come, and the saving effected makes the advance ticket easy to sell.

A revenue of $45 a day on the average is derived from a contract with the distributing agency for the Chicago afternoon newspapers. About three tons of newspapers a day are delivered to the North Shore Line at the Congress Street station of the elevated railways. The truck drivers place the papers on the elevator and they are lifted to an elevated platform, where they are put in a special chute which delivers the papers directly into a baggage car. This car leaves the Loop not later than 1:40 p.m. and completes all deliveries to north shore towns as far as Waukegan, Ill., by 3:15 p.m. The newspaper publishers estimate the weight involved, based on the number of packages, and send the railway company monthly a check, accompanied by a statement of the tonnage. There is no time for the railway company to take weights. A rate of 75 cents per 100 lb. is secured for this business and when the contract was secured the rate was 25 cents per 100 lb. in excess of that charged by the American Railway Express Company. Since that time, however, the latter rate has increased to $1 per 100 lb., so that the newspaper agency is benefiting from a lower rate at present as well as better service, although the matter of service was the consideration which won the contract. In dropping off papers at various stations the North Shore enforces an order that the car must come to a complete stop before the package is dropped. This is a service which has been greatly appreciated, as the papers are not torn and soiled.

CHICAGO NORTH SHORE & MILWAUKEE R.R.
Chicago to Milwaukee Every Hour on the Hour
BAGGAGE HANDLED TO ALL NORTH SHORE POINTS
THE ROAD OF SERVICE
CHICAGO PASSENGER STATION 209 S. WABASH AVE.
Did you ever travel 80 miles an hour?
On your next trip to Milwaukee use CHICAGO NORTH SHORE & MILWAUKEE R.R.
Trains every hour on the hour

Attractive and Expensive Advertisements of the North Shore Line

At left, advertisement on building wall opposite Wilson Avenue station of the Chicago Elevated Railways. At right, billboard advertisement facing down Michigan Avenue, Chicago, for which the North Shore Line paid $1,000 for thirty days.

A good example of what may be accomplished by carefully following conventions and looking ahead to future traffic is afforded from a recent instance. F. W. Shappert, traffic manager, attended the last convention of the Associated Advertising Clubs at Atlanta, Ga., used his influence to secure the next convention for Milwaukee, and then signed up seventy-one clubs from all parts of the country for as many chartered cars over the North Shore Line from Chicago to Milwaukee for the 1922 convention.

One of the most effective phases of the solicitation work done by Mr. Shappert is the large amount of personal service rendered to the various organizations and individuals, ever having it in mind to capitalize the advantage that this service gives him in business for the North Shore Line. In his solicitation work he makes extensive use of the associations of commerce in cities not only along the line of the railroad but in cities at distant points, wherever there is a possibility that their members can utilize the North Shore Line to advantage in their business pursuits or on some special trip.

He makes the comment that any traffic man who does not utilize and work with the commerce associations is overlooking a very important source of information and selling assistance.

Advertising for traffic is a consistent part of the efforts put forth by the Chicago, North Shore & Milwaukee Railroad to influence travel over its lines, and the duller times are the more the company advertises. The normal advertising appropriation for the current year was to have been approximately $35,000, but on account of the business depression advertising was intensified, and, as a result, between $45,000 and $50,000 will be spent this year in this manner. The advertising work is handled by John J. Moran.

It is hardly possible for a person to be long in any one of the cities served by the North Shore road without being reminded of its service in some attractive way. Car cards are carried in the elevated and surface cars in Chicago, Waukegan, Racine and Milwaukee. A 30-in. advertisement is carried once a week in each of the local newspapers in the cities along the line between terminals. In Milwaukee and Chicago papers 600-line advertisements are carried once a week or more, frequently when some special occasion warrants special advertising. Another very effective advertising medium used is the Cusack Company's billboards. The total monthly expenditure for billboard advertising this year is running regularly $550 a month, while $1,000 additional was spent for the month of August for a single billboard, 14 ft. x 50 ft., which is wonderfully located where it is seen by thousands of Chicago motorists and pedestrians every day as they drive or walk along Michigan Avenue toward the bridge connecting Michigan Avenue with the Lake Shore Drive on the North Side. This is pictured herewith.

Each of the regular billboard advertisements is located at an exceptionally strategic point. In Chicago a very attractive advertisement occupying the wall of a building advertises the road to the passengers of the elevated railroad and to the large population in what is known as the Wilson Avenue district, the board being located at the corner of Wilson and Broadway. This advertisement occupies a space 137 ft. x 31 ft. and costs the railway $100 a month, including the original painting and maintenance painting twice a year. In this case the company floodlights the advertisement itself. At the corner of Kedzie Avenue and Madison Street, another important outlying business section on the West Side in Chicago, the company has a 14-ft. x 50-ft. illuminated billboard on which the monthly rental is $100.

Five other billboards in Chicago are erected on the property of the elevated railways. One of these is located on the street level at Wilson and Broadway, one on the South Side on Thirty-ninth Street between State Street and Wabash Avenue, one opposite the Marshfield Avenue elevated station on the West Side, one at Fifteenth and State, and an important one on the Van Buren Street bridge of the elevated facing Jackson Boulevard. These are all illuminated signs. There are also illuminated and non-illuminated signs at points outside of Chicago.

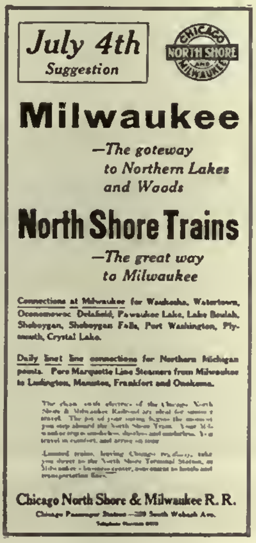
Important Comparison of Rates

FROM	To Cleveland				To Toledo				To Detroit			
	One Way		Round Trip		One Way		Round Trip		One Way		Round Trip	
	Electric	Steam	Electric	Steam	Electric	Steam	Electric	Steam	Electric	Steam	Electric	Steam
TOLEDO - -	$3.08	$4.17	$5.78	$8.34								
FREMONT -	2.27	3.23	4.21	6.26	$ .86	$1.16	$1.67	$2.32	$2.06	$3.39	$4.07	$6.78
BELLEVUE -	1.94	2.49	3.62	4.98	1.30	1.77	2.43	3.54	2.49	4.00	4.83	8.00
NORWALK -	1.57	2.16	2.92	4.32	1.67	2.24	3.06	4.43	2.87	4.46	5.46	8.92
SANDUSKY -	1.62	2.32	3.02	4.56	1.51	1.94	2.81	3.68	2.71	4.06	5.21	8.12
LORAIN - -	.70	1.04	1.30	2.08	2.48	4.06	4.59	8.12	3.68	5.06	6.89	10.12
CLEVELAND -					3.08	4.17	5.78	8.34	4.28	6.39	8.16	12.78

Fast Through Limited Service Every 2 Hours

SHIP YOUR GOODS VIA ELECTRIC PACKAGE

The Lake Shore Electric Railway Company


July 4th
Suggestion

Milwaukee

—The gateway to Northern Lakes and Woods

North Shore Trains

—The great way to Milwaukee

Connections at Milwaukee for Waukesha, Watertown, Oconomowoc, Delafield, Pewaukee Lake, Lake Beulah, Sheboygan, Sheboygan Falls, Port Washington, Plymouth, Crystal Lake.

Daily boat line connections for Northern Michigan points. Pere Marquette Line Steamers from Milwaukee to Ludington, Manistee, Frankfort and Onekama.

Chicago North Shore & Milwaukee R. R.

Do Not Think or Speak Too Harshly

If Something Should Go Wrong With Our Service Occasionally.

Always Remember That We Regret It More Than You.

Our Endeavor Always Is To Give Good Service and Please Our Patrons

The Lake Shore Electric Railway Company

At Left, Advertisement of Rates by Lake Shore Electric. At Right, a Bit of Candor by Same Company. In Center, 45-In. Newspaper Ad of North Shore Line

MOTION PICTURE ADVERTISING VERY EFFECTIVE

Since April of this year extensive use of a motion picture film has produced results which lead the officials of the company to believe that this is the most effective method of advertising for traffic. The motion picture used is a one-reel story having the title "Along the Green Bay Trail." It depicts the mode of travel in the days of the Indian and compares this with the modern high-speed travel in comfort and luxury over the electric line. The comparison of the two modes of travel gives an opportunity to picture many of the beautiful stretches of scenery along the electric line and the high type of rolling stock and roadbed employed in the modern means of travel. The scenario develops a very interesting little story, and the only place in the film that the name of the railroad appears is on the side of the cars as the train comes to rest in the Milwaukee terminal. Consequently, it has been possible to show the picture as an educational film in all of the principal theaters in Chicago and North Shore towns, and also in the towns in southern Illinois and those in Indiana close to the Illinois line and in towns as far west as Rockford, Ill.

Altogether, the film has been shown in some 200 theaters at picked locations, and this is done without cost for the showing, the only expense involved being $5 per day per film to the booking agency. The cost of producing this film was approximately $2,000, including seven standard prints which are used in the theaters. In addition to these prints, the company has three non-inflammable prints which cost $100 each and a small portable motion picture machine which cost $250, which have been used by representatives of the company before various business men's meetings, private clubs, associations of commerce, etc., probably averaging at least one showing a week somewhere. At Chicago's elaborate Pageant of Progress it was shown sixty times a day, and as a result several specific instances of its influence in "selling" the road were experienced. One woman watched the film through and then asked numerous questions and later came back and informed the attendant at the booth that she was taking a party of thirty-five to Milwaukee over the electric line that night. A man who became interested in the picture chartered two cars to take a party of 125 to Milwaukee, explaining that he had seen the company's advertisements, but had not realized the advantages of the North Shore Line until he saw the motion picture. Several other instances of definite business for the company are known to have developed from the showing of this film at the pageant.

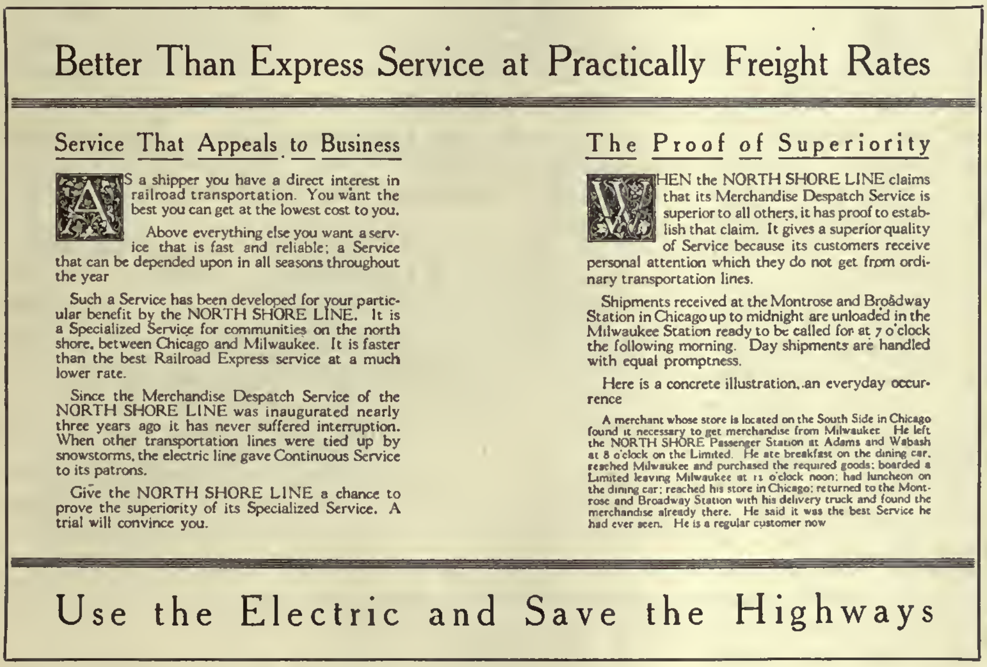
Arrangements have been completed for showing the film at the Lake County, Ill., Fair, the Ozaukee County Fair at Sheboygan, Wis., and at the Electric and Food Show in Milwaukee, all this fall.

LAKE SHORE BELIEVES IN ADVERTISING

J. F. Starkey, general passenger agent Lake Shore Electric Railway, Sandusky, Ohio, summarizes his recent activities as follows:

"I advertise constantly in the newspapers, giving the public the time of all our trains, and when anything of special importance is to occur along the line I advertise it in all the papers, using, usually, a 5-in. double column display for about a week previous to the affair. I carry a two-color advertisement, 11¼ in. x 16½ in., in the front of each compartment of all our cars, changing it about every four months. Beginning with the late spring I advertise the summer resorts, of which we have several along our line, and at other times anything that I think will attract the eye and get us patrons.

"I have advertised quite extensively the fact that our rates are lower than the steam line rates, especially since the advance of the latter to 3.6 cents a mile. In the cars I carried not merely the statement that our rates are lower, but compiled a table of comparative rates between main points and with cards about 10 in. x 14 in. gave the fact wide publicity throughout the cities and towns which we serve. At first some steam line representatives took exception to this, but we defended our action simply by claiming the right to resort to any legitimate means of securing traffic, and nothing further has been heard of it.



Better Than Express Service at Practically Freight Rates

Service That Appeals to Business

AS a shipper you have a direct interest in railroad transportation. You want the best you can get at the lowest cost to you.

Above everything else you want a service that is fast and reliable; a Service that can be depended upon in all seasons throughout the year

Such a Service has been developed for your particular benefit by the NORTH SHORE LINE. It is a Specialized Service for communities on the north shore, between Chicago and Milwaukee. It is faster than the best Railroad Express service at a much lower rate.

Since the Merchandise Despatch Service of the NORTH SHORE LINE was inaugurated nearly three years ago it has never suffered interruption. When other transportation lines were tied up by snowstorms, the electric line gave Continuous Service to its patrons.

Give the NORTH SHORE LINE a chance to prove the superiority of its Specialized Service. A trial will convince you.

The Proof of Superiority

WHEN the NORTH SHORE LINE claims that its Merchandise Despatch Service is superior to all others, it has proof to establish that claim. It gives a superior quality of Service because its customers receive personal attention which they do not get from ordinary transportation lines.

Shipments received at the Montrose and Broadway Station in Chicago up to midnight are unloaded in the Milwaukee Station ready to be called for at 7 o'clock the following morning. Day shipments are handled with equal promptness.

Here is a concrete illustration, an everyday occurrence

A merchant whose store is located on the South Side in Chicago found it necessary to get merchandise from Milwaukee. He left the NORTH SHORE Passenger Station at Adams and Wabash at 8 o'clock on the Limited. He ate breakfast on the dining car, reached Milwaukee and purchased the required goods; boarded a Limited leaving Milwaukee at 12 o'clock noon; had luncheon on the dining car; reached his store in Chicago; returned to the Montrose and Broadway Station with his delivery truck and found the merchandise already there. He said it was the best Service he had ever seen. He is a regular customer now

Use the Electric and Save the Highways

Two Inside Pages of Four-Page Folder Sent to Prospective Merchandise Customers by North Shore Line

Cover of the I. T. S. Timetable

"Through close touch with connecting lines we urge the sale of through tickets whenever possible, and, of course, through the Central Electric Traffic Association, each traffic manager seeks to help a sister line all he can. In connection with the Western Ohio Railway, the Toledo, Fostoria & Findlay Railway and the Fostoria & Fremont Railway we offer a week-end reduced rate to Sandusky during the Cedar Point season. This rate is about 80 per cent of the regular fare. To Indiana interurban lines as well as the Wabash and Clover Leaf steam lines we offer the same reductions as a basing rate, and during the season we have many excursionists to Cedar Point, Cleveland and Niagara Falls. We also sell many tickets to Niagara via our line to Cleveland, the C. & B. Transit Company from Cleveland to Buffalo and the International Railway to Niagara. These rates are made good for twelve days returning and at about the same percentage of reduction as noted above. We offer special car rates that bring us much additional revenue, particularly during the summer seasons. These rates are about 70 per cent of the regular round trip rates."

THROUGH PASSENGER SERVICE SUCCESSFUL

J. A. Greenland, general passenger and freight agent Indiana Service Corporation, Fort Wayne, Ind., had this to say about building up traffic:

"I think the biggest thing we have done is the inauguration of fast county-seat-stop trains between Indianapolis and Fort Wayne, which service has been extended just recently to Lima. These trains are very seldom late and are handling an increasing number of people. Every day we hear compliments on this service and hope when business picks up to put on more such trains. We have just closed a successful campaign for Niagara Falls excursion traffic and are very much pleased with the business we have received. We handle the people through to Toledo by our line and the Ohio Electric Railway carries them to Cleveland, where they take the Cleveland & Buffalo boat line to Buffalo."

Another thing that the Indiana Service Corporation has done is to originate a timetable which shows all the through connections with other electric lines at the terminals of its lines. This has proved to be a great convenience to patrons who find it very difficult to figure out through connections where a number of timetables must be consulted. It is serving to induce more interline riding. This plan, of course, serves to stimulate traffic for other companies as well as the Indiana Service Corporation, but the idea is that the plan will later become reciprocal.

The Interstate Public Service Company, which operates the unified and greatly improved interurban line between Indianapolis and Louisville, has been very successful in building up both its passenger and freight business. The installation of fine new all steel cars and fast through schedules has attracted a considerable increase in the number of passengers. Similarly, the inauguration of an overnight freight service over practically the entire system has attracted a large amount of tonnage. No small factor in the success of the company in thus rapidly building up its business has been an active traffic department, backed up by good service and unusually good co-operation on the part of the operating department. Speaking in general terms on this subject, Bert Weedon, traffic manager, summarized the requisites of a successful interurban as being, first, thorough knowledge of the territory; second, ample equipment to care for the need of this territory; third, a freight organization with ability to cope with competitors; fourth, thorough and constant solicitation; fifth, reliable freight schedules which will supply the demand for transportation.

Sunday excursions, running from Indianapolis to Louisville one week and from Louisville to Indianapolis the following week, were inaugurated on July 31 to extend through August. On July 31 a three-car train carried a total of ninety-six passengers out of Indianapolis and a total of 206 into Louisville. On Aug. 7 114 people were carried out of Louisville and a total of 262 into Indianapolis, a three-car train out of Louisville having been relieved by two cars additional from Columbus to Indianapolis. The round-trip rate given was $3 between the terminal cities, with a correspondingly low rate from intermediate cities. L. M. Brown, superintendent of transportation, reports that these excursions were a profitable undertaking.

DETAIL INFORMATION ABOUT SHIPPERS IS HELPFUL

The Chicago, Ottawa & Peoria Railway, Joliet, Ill., is working intensively to secure all available business, if one may judge by information furnished by A. M. Farrell, general freight and passenger agent. The company prepares for intensive solicitation by delegating one of its traffic agents to call upon every merchant or manufacturing concern at any point along the line and secure information indicated on a questionnaire which he fills out as a result of his interview. This questionnaire, when completed, gives the name, address, nature of business, from what point on the company's line this concern receives freight or express, the names of the shippers, who controls the routing and if controlled by the consignee, a copy of the routing order, freight received from foreign lines and whether this is transported by steam or electric railway or motor truck. The questionnaire also calls for information as to whether the concern ships any freight or express, and if so, how it is transported, what the routing orders are, and, if any shipments are made by trucking company, the rates are secured if possible. A final question is whether this concern or party has any grievance with any department of the railway company.

By a study of the information thus secured it is often possible to show shippers where the electric line can make them a saving either of money or time in the handling of their business. This is working out to the mutual benefit of all interested parties. When any routing orders are received they are personally placed by the railway company's solicitor, which gives him a chance to ascertain whether or not the shipper has any other shipments that can be handled.

Mr. Farrell has found that the passenger business of his company depends a great deal upon the advertising which is done in newspapers and upon direct solicitation. A good deal of passenger traffic is secured through the handling of lodges and various organizations on picnics and conventions, mostly to Starved Rock, Ill. When advance notice of such a group movement is obtained the railway company has a circular printed for the organization which covers the full details of its picnic and the attractive features of the point at which the outing is to be held. These circulars are then distributed among the members of the organization and prove a very desirable form of advertising, for the reason that the suggestions of the company go into the homes of members of the lodge or other organization backed up by the committee of the lodge in charge of the picnic, whose names are printed on the circular. Often, where members are unable to take advantage of the trip at just that time, they avail themselves of a similar trip later on.

Mr. Farrell makes the observation that all electric lines should inaugurate an extensive plan for solicitation of business moving between their stations and keep in close touch with the consignor and consignee in order to straighten out any difficulties that might arise and thus establish confidence in the electric lines. He considers that every electric line should solicit business just as the wholesale grocery salesman solicits orders for his house. He contends that it is the continual repetition in advertising and solicitation that brings results and works out to the mutual benefit of railway and shipper.

C. P. Ryan, general passenger and freight agent Indiana Railways & Light Company, Kokomo, Ind., explained that for certain reasons the traffic department has been able to do but little advertising or solicitation of freight and passenger business during the last six or eight months. He says: "Our main efforts are directed toward our agents along the line of inducing them to be courteous and obliging to those who would ship freight or take passage on our cars. We urge them to promise nothing but what can be fully accomplished by our service, and we believe that this system, in the absence of actual advertising and solicitation, has accomplished a great deal toward putting this company on the list regarded as reliable in its dealings with other business men."

The creed of E. Hamprecht, general freight agent Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio, in soliciting business is thus summed up: "I find good service is the greatest advertisement. Give all you can for the money and make the patrons feel that you are interested in their walfare. Do as you promise and keep in constant touch with shippers and consignees. If this is done it will not be long until the returns will be noticeable."

H. A. Benjamin, general freight and passenger agent Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa, is quoted as follows:

"We have always tried to notify the industries which we serve of the movements of their business both in and out bound, and on their inbound business to furnish the time of arrival some twenty-four hours in advance. We have found that they are very appreciative of this information. In my opinion, in order for a railroad to increase its business it should establish service that is reliable and continue this service in such a way that the public learns to have confidence in it. This must be accompanied by close personal contact with those served."

The Chicago & Joliet Electric Railway, which operates out of Chicago and connects at Joliet with the Chicago, Ottawa & Peoria Railway, has found a profitable source of passenger business in a joint arrangement for carrying passengers from Chicago to the beautiful Starved Rock State Park, located on the latter line 83 miles from Chicago. Through tickets are sold in each direction and the cost of advertising is proportioned between the two roads. Attractive folders and space in Chicago newspapers have been used in the advertising program. Notwithstanding the industrial depression, W. H. Heun, superintendent of transportation, reports that his company has advertised the passenger service this season to about the same extent as in previous years in order to keep before the people the points of interest and the electric routes for reaching them. He commented that special care is taken in making arrangements for picnics to promise only what can be carried out to the full satisfaction of the patrons as to transportation and park privileges, this leading to repeated annual trips of excursion parties. He believes that truth in advertising is an important factor in soliciting excursion business and has been the means of holding as well as increasing traffic.

Railways Could Profitably Undertake Joint Advertising Campaigns

By J. C. Schade
General Manager Winona Interurban Railway, Warsaw, Ind.

WE OFTEN HEAR it said that advertising in the railway field is limited and this is a true statement if we decide to follow the time-worn paths of the old school. It must be admitted that service is the foundation of railway publicity, and in order that advertising may be effective service must be made to back up the whole proposition.

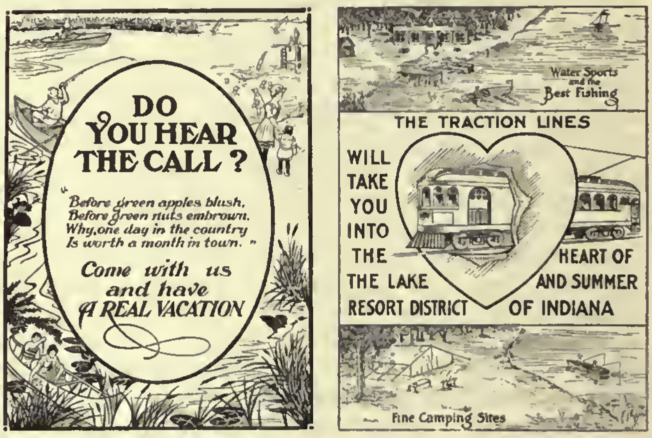
But it does not follow that when we have advertised the fact that "Cars run every hour between Podunk and Squeedunk" that the field has been covered! We should go further and tell the people of "Podunk" something about the interesting things which may be found in "Squeedunk." What is meant by this is that a successful railway publicity campaign must create a desire among the people of one locality to see what is actually going on in some other locality. It makes no difference how small the town may be, there is always something of interest to draw the outsider.

For example, the attractions of Indiana are its lakes and summer resorts dotting the whole northeastern part, its great manufacturing industries in what is known as the Gas Belt section, its State parks in the southern part and its great educational centers. Any one of these things would be suitable subject matter for advertising copy. Similarly interesting points and industries may be found in other localities and it would seem to me in looking at the proposition from this angle that we are overlooking an opportunity in the advertising field when we do not take advantage of the splendid material scattered around in our front yards.

Looking back over a period of years, we may find here and there an effort on the part of some of the electric railways to advertise things of local interest, but in the main, our efforts have been largely directed toward a scramble of local time cards, which if taken separately indicate to the public that there are only one or two electric railways operating in the entire country.

In this connection, it would seem that we are all more or less at fault. We do not place sufficient importance upon the question. For example, pains should be taken to inform travelers in South Bend how best they can get to Louisville. It would be good advertising to put this information into the hands of the public in an intelligent way. It is good business to show people how they can go from Podunk to Squeedunk and better business to show them how to get from Squeedunk to any other place.

Getting back to the question of feature advertising —we tried it out in a small way this year. With the assistance of some of the Indiana lines, 25,000 four-page pamphlets (reproduced herewith) which were descriptive of the lakes and summer resorts located in the territory served by the Winona Lines were distributed. The results have been most gratifying. In checking up with the various hotel managements, it was learned that a large number of new people had been attracted to these places, because of the publicity afforded by the pamphlet.


DO YOU HEAR THE CALL ?
"Before green apples blush,
Before green nuts embrown,
Why, one day in the country
Is worth a month in town."
Come with us and have A REAL VACATION
Water Sports and the Best Fishing
THE TRACTION LINES
WILL TAKE YOU INTO THE HEART OF
THE LAKE AND SUMMER
RESORT DISTRICT OF INDIANA
Fine Camping Sites

Two Outer Pages of Attractive "Outing Folder" Distributed by Winona Interurban

Let us suppose that all of the attractions in Indiana, Ohio or Michigan were treated in this manner and that the advertising campaign was put out on a co-operative basis by the several interurbans interested. There could be no question about successful returns. The normal American citizen is chock-full of play; his curiosity is easily aroused; make a noise and he wants to investigate. Why not "blow the horn" and give him a chance to come and look? It is up to the electric railways to stimulate interest in places that will mean traffic for them.

The Central Electric Traffic Association is to be commended upon its recent effort to unify the rates of fare to conventions and large gatherings. It is now no longer necessary to secure the consent of individual carriers to establish reduced fares. The Traffic Association has delegated this power to a committee and the result is that the central territory railways are operating as a unit.

Let us hope that in years to come we may operate as a big family, joining in one big effort to tell the people of Squeedunk about the wonderful things which are to be found in Podunk, to tell the poor fellow at South Bend how to get to Louisville over four different traction systems without referring to a grip full of time cards, and to remove the "whereases" and "wherefores" of the individual lines and operate as an industry.

The Latest Addition to the Transportation Salesman's Stock in Trade Opens Up Many New Avenues for Selling Transportation and Developing New Car Riders

A New Merchandising Agent—The Rail-less Vehicle

An Editorial Discussion

AND what of the rail-less vehicle—the trolley bus and the motor bus? From the standpoint of the transportation man, in his rôle of salesman, in his attempt to furnish a product to meet the customer's wishes, in his effort to do business as any first-class business man by supplying his customers with complete needs in his line, the least that can be said of bus transportation is that it deserves careful study and analysis. If it will serve the transportation man in his business he should grasp the opportunity to use it not only in the places where he knows he cannot afford to operate rail service but to supplement existing routes where it is necessary to meet the wishes of the traveling public. For, today, there is a real demand on the part of the public to ride on rubber tires out in the open and for that privilege in some cases it is willing to pay a higher rate of fare. The use of the bus on the part of the traction companies also affords them many new avenues of selling transportation, thereby increasing their own usefulness to the community, in that they are able to serve a larger territory and a greater number of patrons. It also affords a means of maintaining the transportation monopoly which community welfare demands, thereby keeping out the competitor who seeks to provide service to points now readily reached by the existing transportation agency.

As yet, unfortunately perhaps, the railway man has failed to grasp the many opportunities that lay before him for bus service. But the transportation salesman who is a close observer of traffic and the whims of the traveling public is watching the rail-less vehicle. He believes it is a new and undeveloped means for increasing his volume of business both by adding new customers and by securing more purchases from old customers. This type of vehicle, he claims, has both an economic and a merchandising sphere in passenger transportation and it should receive the attention of every railway executive.

Purely from the standpoint of selling transportation, therefore, which is the fundamental service of electric railways, it would seem that rail-less vehicles can be used in both complementary and supplementary service.

There is no doubt that the public likes to ride on rubber tires, and also that the public wants increased service in many places. As stated before, the rail-less vehicle thus affords a merchandising agency to satisfy these demands. Taking into consideration the psychology of the public it deserves study by railway men. At a minimum of investment, it sells transportation that is new and that is needed.

By complementary service is meant the various classes of extensions and feeder service. For instance, extension or feeder service can be run from the end of the main street line where there are several hundred families within 1 or 2 miles. The installation of bus service in such cases not only supplies cheaply a transportation need but also develops more riders for the main railway system. Then again, bus service is feasible for outlying or remote townships or suburban centers that are infrequently served by steam railroads and that also have no interurban connections. Such service develops traffic; enables the townspeople to reach a real shopping center and fosters community interest.

The bus also offers a means to aid urban crosstown traffic by connecting the open links to form belt lines around the main and congested traffic center and to aid through traffic by connecting open links in interurban systems. There can be no question but that these applications of the rail-less vehicles will sell transportation and develop new business.

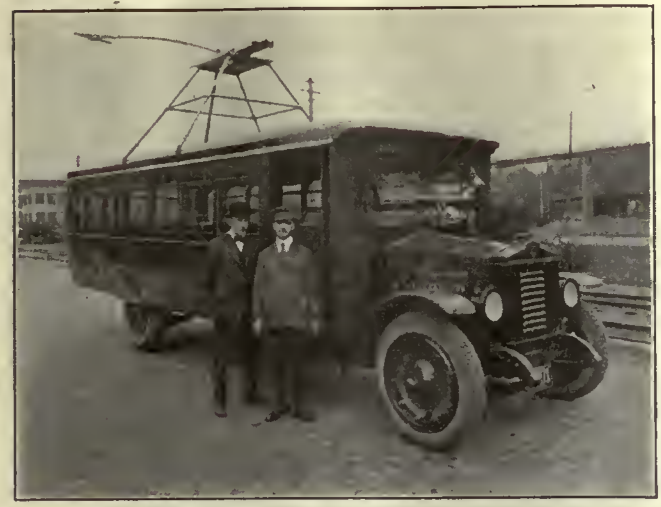
By supplementary service is meant that which assists in carrying traffic on what might be called, in a general way, existing routes. For example, in many cities there is an opportunity to use the rail-less vehicles on boulevards or other streets which are not served by railway vehicles in a sort of de luxe service on which a higher fare can be charged. This also often aids the main transportation agency by relieving overloaded heavy traffic lines. The coach systems of New York, Detroit and Chicago are outstanding American examples of this supplementary service.

The rail-less vehicle can also be used on routes which are overcrowded during rush hours. Here the rail-less vehicle is able to aid the rail system not only by transferring a certain number of passengers to the de luxe service, but also by giving an ordinary service. This kind of operation need not be confined and preferably should not be confined to the same streets on which the rail cars operate, but should be given simply between the same termini. In this way it is evident that a territory not heretofore directly furnished with transportation is traversed and becomes a source of some considerable traffic. Such supplementary service is good business, as it makes for better service and pleases the public. In general, it appears that it can be offered most economically by a rail-less vehicle.

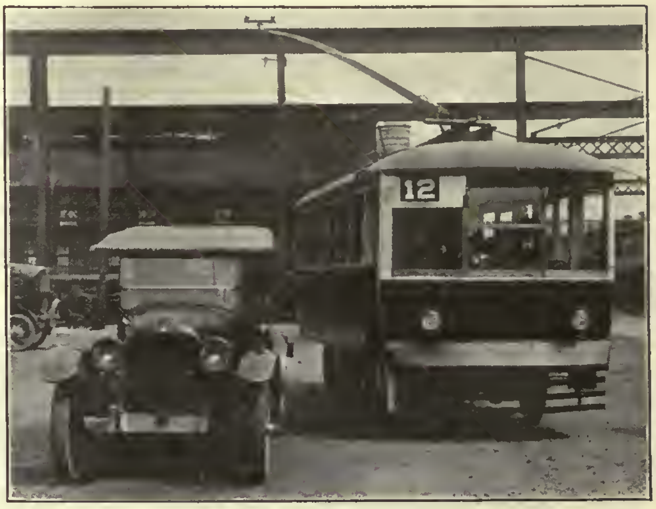
WHAT ABOUT THE ECONOMICS?

In a general way the economic situation today, at least so long as the public roadway is used, in addition to the merchandising element, provides certain saving arguments for the rail-less vehicle.

There exists in practically every traction community today a want for additional transportation service. The existing railways have found that it is increasingly difficult to finance these extensions with rail service and



Trolley Bus Developed by Trackless Transportation Company, New York, N. Y. Seating Capacity Twenty-nine. General Electric Equipment Used



"Rail-less" Car Developed by J. G. Brill Company, Philadelphia, Pa. Seating Capacity Twenty-eight. General Electric Equipment Used

often if these extensions were built the fare necessary to come anywhere near meeting the cost of the service operated would be so high that riding would be discouraged, with the result that the losses would have to be borne by profitable lines.

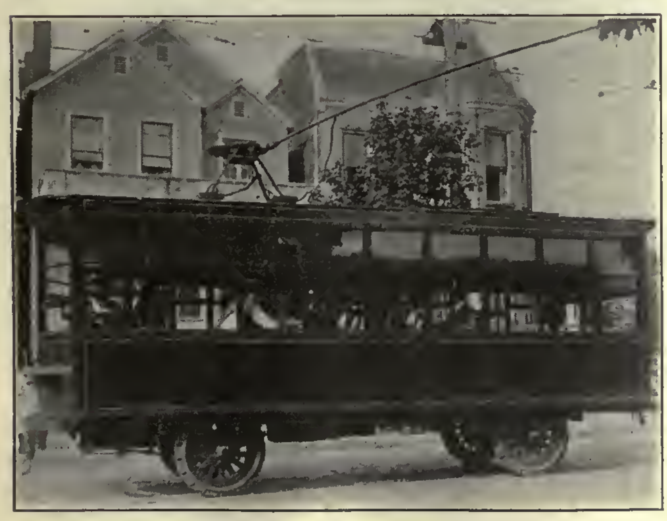
In such cases the railway can not afford in this day to neglect to provide for the growth of the community. If it does it will not be long before independent operators enter the field, and instead of co-operation to render the most economical form of transportation to answer the needs of the community there at once begins direct competition. These operators will attempt to carry passengers not alone from the terminus of the existing railway line but will duplicate existing rail service in an endeavor to reap as large a profit as possible. The usual result has already been demonstrated in several communities.

It is not always to be expected that at the start bus operation will be self-supporting. That has long been true of rail extensions as well, but with the bus it is possible, due to its mobility, to shift its route from time to time so as to accommodate the greatest number of persons. This fact alone is one of the reasons why bus transportation will play such a real part in the future passenger transportation field. Already under private individual ownership the motor bus has fulfilled a popular demand and it is now incumbent upon the existing traction companies to supply this service as a part of their own organization where the circumstances warrant.

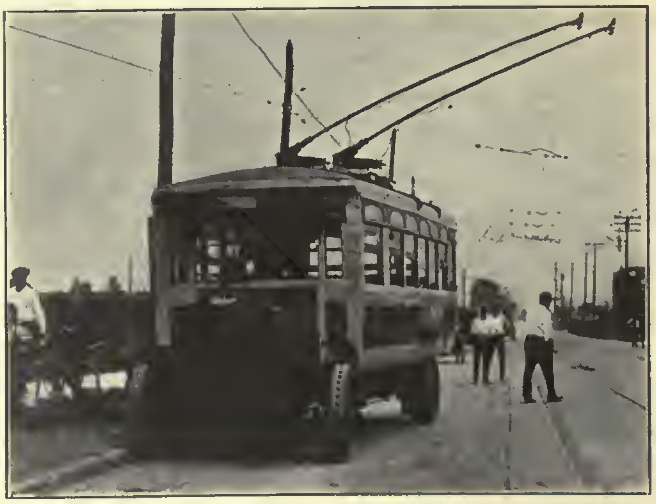
It is obvious that one organization furnishing co-ordinated service will supply better transportation than can several companies or individuals supplying duplicate and competing service. President Gadsden of the American Railway Association said nearly a year ago "that the railways themselves must adopt and use the motor bus in its correct economic sphere."

The traction companies have within the last year or two begun to recognize the attitude of the public mind toward the motor bus. Information gathered shows that about twenty-five electric railways are now operating approximately 130 vehicles either in complementary or supplementary service. In some cases the fares charged are a part of the street car fare, while in others an endeavor is made to maintain bus operation on its own feet.

As yet, however, only a start has been taken by the



"Trollibus" Built by Atlas Truck Company, York, Pa., for Operation by the Virginia Railway & Power Company. Seats Thirty Passengers. General Electric Equipment Used

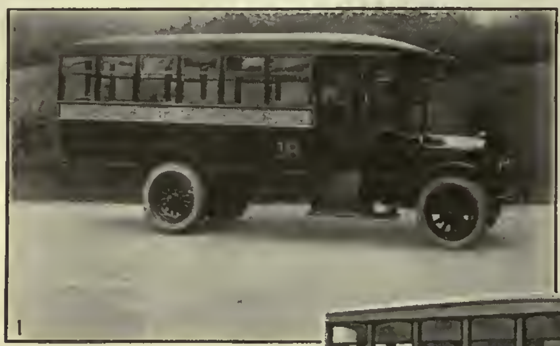


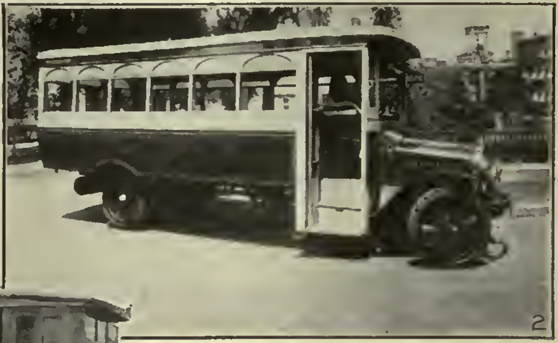
Trolley Bus Designed by Packard Motor Car Company, Detroit, Mich. Brill Body on Standard Packard ED Chassis. Seats Twenty-five Passengers. Westinghouse Equipment Used traction companies in using rail-less transportation as an adjunct of their service. Its many possibilities have not really been recognized by the operators of rail-borne vehicles.

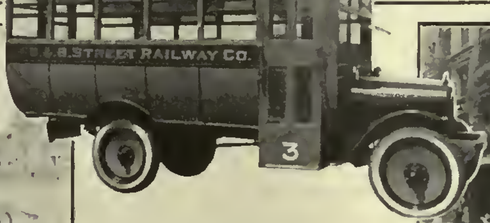
TRANSPORTATION ADVANTAGES

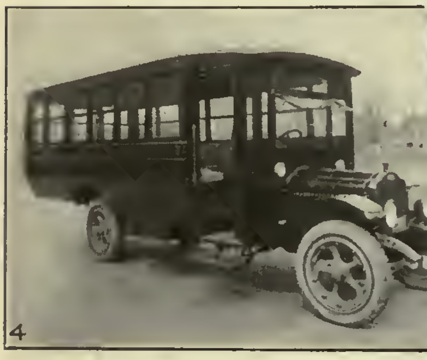
From a transportation standpoint the motor bus and trolley bus appear to have distinct characteristics not possible of the rail-borne vehicle. The motor bus has two that make it the most mobile unit. One of these is its ability to be shifted at the will of the operator from one street to another as traffic conditions change; the other is its ability to avoid traffic "jams" or getting tied up on account of accidents to other units or fires along the route of operation. With the trolley bus much of this mobility is found wanting—due to being tied to overhead wires for power. While it is true that it can pass around other vehicles stalled on the street, it must nevertheless follow a fixed route.

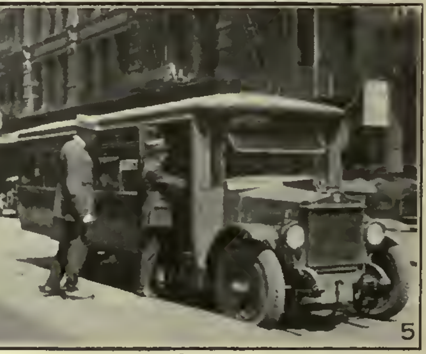
Sidewalk loading is also possible for each unit—a practice which is of great value to those that must patronize public service conveyances. This method of loading and unloading eliminates a class of accidents prevalent with rail-borne vehicles that has made it necessary to promulgate police restrictions which often impede instead of facilitate other forms of vehicular street traffic.



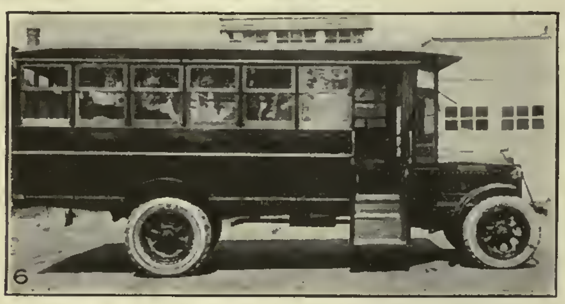








Typical Motor Buses



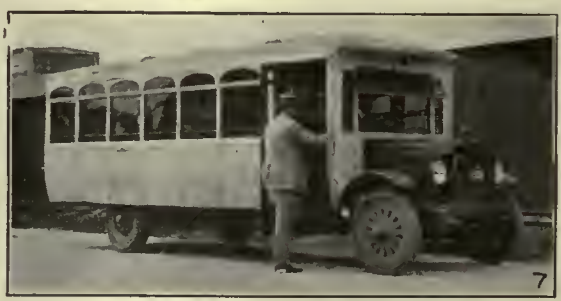


Fig. 1—The Ultimate Truck, Type AJL. Designed and built by Vreeland Motor Company, Inc., Newark, N. J. Seating capacity twenty-two. Uses Buda motor with Sheldon worm drive.

Fig. 2—Motor bus developed by International Motor Company, New York, using Brill wood body on standard AB chassis, with longer springs and wheelbase. Special rubber spring blocks in spring suspension housings give easy riding with solid tires. Seating capacity twenty-five.

Fig. 3—Standard type of transit body built by Paterson Vehicle Company, Paterson, N. J., mounted on Reo chassis, for use by Danbury & Bethel Street Railway.

Fig. 4—White Motor Bus, used by Gloucester Auto Bus Company, Gloucester, Mass. Two-ton capacity chassis, mounting wood body, seating twenty-seven passengers.

Fig. 5—The Imperial Omnibus. Designed and built by the Trackless Transportation Company, New York. A low center of gravity type omnibus. Buda motor and Clark type rear wheel internal drive. Kuhlman truss side all steel body. Seating capacity twenty-nine.

Fig. 6—Day-Elder motor bus, manufactured in Newark, N. J. Zig-zag seating arrangement gives wide aisles and makes for easy unloading when crowded. Buda motor and Sheldon worm drive rear end used. Seating capacity twenty-five.

Fig. 7—Low floor type of motor bus developed by Republic Truck Sales Corporation, Alma, Mich. Uses Knight sleeve valve motor with rear wheel internal drive. Seating capacity twenty-five.

It is not considered at all necessary for a railway to build up an entirely separate operating and maintenance organization if it decides to operate buses. To-day the majority of companies maintain a well-equipped garage under the jurisdiction of the master mechanic to look after the present automotive equipment now used by their track and line departments. It is but a step forward for this same maintenance force to care for the passenger bus, and so far as mechanical details are concerned it is impossible to see any difference except that perhaps it needs closer inspection for it must not be allowed to fail in service. Nor is a separate transportation organization necessary except in so far as bus operators are concerned. Supervision can and should be given by the traffic inspection force used for the existing rail lines.

About the only thing that would be duplicated if rail-less service was rendered would be the accounting system to determine the cost of operation. There appear to be two methods that can be followed—one is to keep separate accounts, which at the end of the fiscal period would be added in with the cost of rail service, while the other is to keep the entire cost of operation separate and add only the net result into the income account.

It is doubtful if the motor bus and trolley bus will supplant at present much if any of the existing rail lines.

The field of the bus, it appears, is not to supplant existing trolley routes but rather in furnishing complementary and supplementary service thereto. The bus can do a real work in developing new territory adjacent to growing communities and can also aid in establishing community spirit between neighboring towns and villages until sufficient density of traffic has been developed to warrant the necessary expenditure for rails, power plants and distribution systems; that is to say, a more extensive transportation system.

Editorially the ELECTRIC RAILWAY JOURNAL has already taken the position that there is a distinct field for this mode of transportation, and that it should be operated as an adjunct by existing traction companies.

There is no fear that many rail systems will be supplanted by bus systems. It is self-evident, however, that the facts as they now exist indicate a growing public use for rail-less vehicles in transportation. The field has been over-emphasized by some and under-emphasized by others. It appears that those who know most about transportation, urban and interurban, are the ones to apply the most sound business and sales ability toward the correct application of this method of transportation.

Of course the ever-rising question of cost is in the mind of every one who would like to study this situation. Several studies have been made to determine the facts, and these are now being published. One of these studies follows.

An Analysis Indicates that, Based on Cost of Service Alone, the Rail-less Vehicle, with Its Smaller Fixed Charges, Can Compete with Rail-Borne Vehicles in Certain Circumstances

The Bus Transportation Field

By C. W. Stocks

Associate Editor "Electric Railway Journal," New York, N. Y.

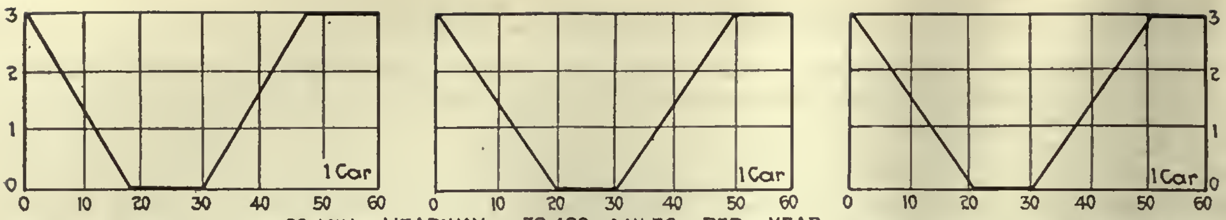
THE cost of rendering service using the motor bus, the trolley bus and safety car as part of a co-ordinated system has for some time past been a matter of much conjecture. In an attempt to determine the facts as they exist a comprehensive study has been made of the cost to build and operate a 3-mile line under varying headways with each type of equipment. In this study data were drawn from experience in so far as they were available. The figures are based on the theory that the 3-mile line is an extension of an existing transportation system, either a bus system or a trolley line. If the existing transportation system is a trolley line, there would naturally be advantages in the use of the same kind of equipment on the extension and these would be reflected in considerably lower maintenance and transportation costs than those indicated in the tables. On the other hand, if the city system was operated by buses, the same economies would follow the use of buses on the extension. The figures, like estimates of this kind, are intended to reflect average conditions and costs only. Individual cases are quite apt to show a divergence from them.

Another factor which has not been included, because it has been impossible to evaluate it, is that of relative obsolescence of the three classes of vehicles. Nevertheless, it is probable that as the electric railway art is older there is comparatively less chance of radical changes in the art than with the newer type of vehicles.

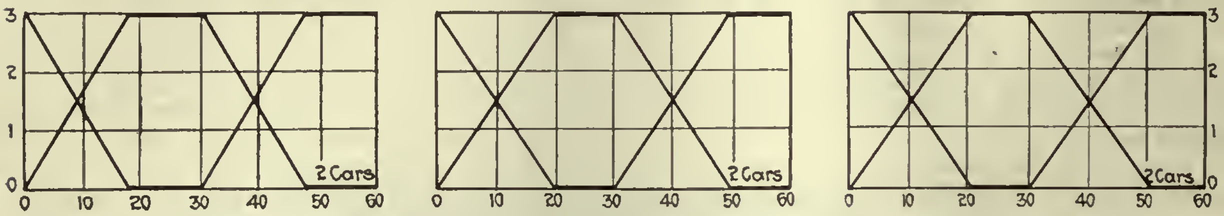
It should be understood that this analysis does not involve the question of supplanting rail service with service by rail-less vehicles. If this is contemplated it becomes necessary for the new form of service to earn not only its own fixed charges but also the depreciation, fixed charges and taxes on the investment in rails and distribution system supplanted. Such items must be added to the total cost of service shown in the supporting tables and curves for the rail-less vehicles to be used, in order to get a strictly comparable basis with the safety car.

Based on the hypothesis just stated, the analysis indicates that where the traffic is thin the field of the highway-borne vehicle is superior. On the other hand, as traffic requirements increase, the lower cost of operation of light, rail-borne vehicles gradually offsets the fixed charges for the necessary rail investment, so that, with the assumptions used, headways of less than 2½ minutes can be operated most economically with rail-borne safety cars.

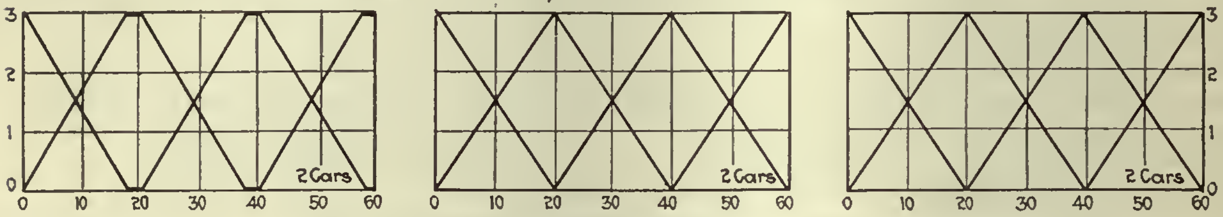
The analysis also shows that the motor bus has the most varied field and is cheaper where traffic requires less than 116 seats per hour. This means that schedules calling for headways of fifteen minutes or more can be operated economically only with the motor bus. The trolley bus, due to the investment required for overhead wires and the slightly greater cost of the vehicle itself, even though its bare operating costs are less than the motor bus, has its field of economic operation between the motor bus and the rail-borne vehicle. Traffic requirements calling for headways ranging from two and one-half to twelve and one-half minutes which furnish from 720 down to 150 seats per hour can best be handled by the trolley bus.



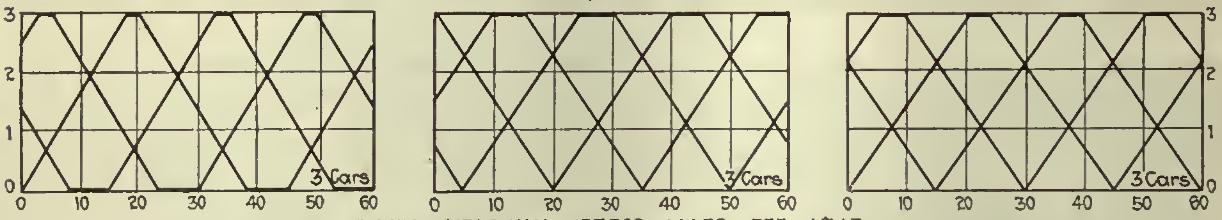
60 MIN. HEADWAY, 39,420 MILES PER YEAR



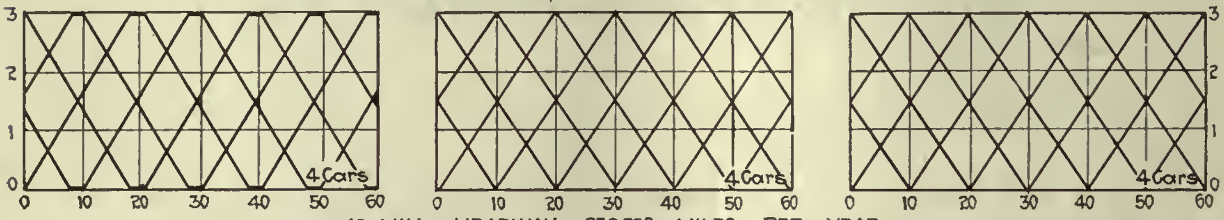
30 MIN. HEADWAY, 78,840 MILES PER YEAR



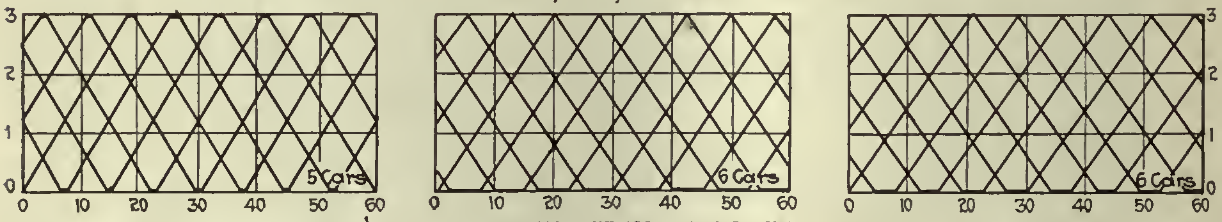
20 MIN. HEADWAY, 118,260 MILES PER YEAR



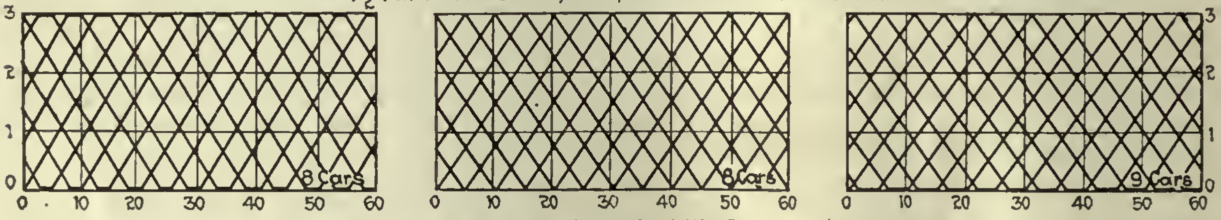
15 MIN. HEADWAY, 157,360 MILES PER YEAR



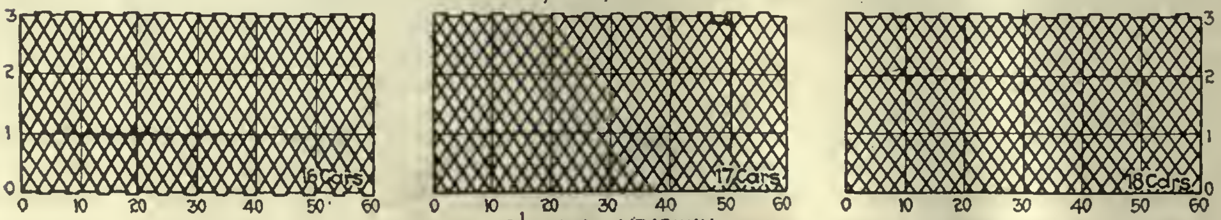
10 MIN. HEADWAY, 236,520 MILES PER YEAR



7½ MIN. HEADWAY, 315,360 MILES PER YEAR



5 MIN. HEADWAY, 473,040 MILES PER YEAR



2½ MIN. HEADWAY

946,080 MILES PER YEAR　963,326 MILES PER YEAR　952,971 MILES PER YEAR

Reading from Left to Right, Operating Schedules for the Motor Bus, the Trolley Bus and the Safety Car at the Headways Assumed

It is only natural that the bus is shown to be the most economical for operation under long headways; that is, where the traffic is thin. In reality this appears to be the field which has the greatest possibility of future development, for practically all of the needed extensions that the railways should have built in the past few years are just suited for exploitation by the rail-less vehicle.

It is evident that even with present costs of new construction urban transportation facilities cannot be built so as to operate at the rate of fare in effect on systems built under pre-war conditions. The investment for track alone would provide many vehicles.

This difference in investment necessary as between the several modes of transportation is sufficient to warrant the railway operator in adopting the bus for original development purposes on (1) extensions to existing rail lines; (2) for crosstown services, especially between factory districts and housing developments that have no direct rail service; (3) for belt lines in urban centers to connect mid-points of rail routes so as to facilitate passenger convenience and reduce the time spent in traveling via a roundabout rail route. As the density and permanency of the traffic develops other types of vehicles may be found more economical of operation.

Both the motor bus and trolley bus are also possible of use to supplement existing rail service where traffic has outgrown present track facilities. In the case of the motor bus, though, it is not necessary to confine its route of operation to that of the existing rail service, but simply between the same termini. Even an entirely alternate route through adjacent territory can be used, thus opening up new territory not heretofore directly furnished with transportation. Another undeniable field for the motor bus is to outlying suburban points even as far as 20 miles where only several trips a day are necessary to meet the traffic requirements.

The 3-mile route was selected as the basis for computation in the belief that from an analysis of the cost of service thereon the relative practicability of each mode of transportation could be indicated. Such a length of line may also be considered as the average needed extension branching off of an existing route or for a new route starting from some civic center and tapping territory not served by other forms of transportation.

Among the factors considered in making the analysis were those of service, speed and mobility of operation. The service was laid out to operate on headways varying from sixty to two and one-half minutes in order to determine the variations in cost of service as the number of vehicles and car-miles increased. The whole analysis was predicated on the standard classification of accounts for electric railways. By so doing direct comparisons as to costs for each form of vehicle can be made.

For convenience of operation and ability to maintain the proper headways a double set of overhead wires were strung for trolley bus operation in view of the tight schedule when the headway was reduced to twenty minutes. Double tracks were considered necessary for operation of safety cars when running on less than a fifteen-minute headway.

It is estimated that approximately the same amount of traffic can be handled on each form of vehicle, although undoubtedly a safety car can carry a greater number of standees. It was assumed that the motor bus and trolley bus would seat twenty-nine and the safety car thirty. On the basis of maximum capacity, the buses would each carry forty-five, as compared to fifty-three on the safety car.

TABLE I—INVESTMENT ACCOUNT UNIT COSTS

	Unit	Motor Bus	Trolley Bus	Safety Car
Vehicles	Each	$7,500	$8,000	$6,000
Seating capacity	Each	29	29	30
Garage or carhouse, including shop space	Per vehicle	$750	$750	$750
Land for garage or carhouse	Per vehicle	250	250	250
Shop tools and machinery	Per vehicle	250	250	250
Electric lines { Single pair	Route-mile	....	4,500	....
Electric lines { Double pair	Route-mile	....	6,000	....
Distribution system { Single track	Route-mile	....	....	3,500
Distribution system { Double track	Route-mile	....	....	7,000
Track construction { Single track	Per mile	....	....	30,000
Track construction { Double track	Per mile	....	....	60,000

The unit prices used in calculating the total investment for each mode of transportation are given in Table I. The prices used are believed to be conservative and, except for the cost of vehicles, represent pre-war prices. Present-day prices were taken for the rolling stock in each case.

In calculating the cost of service many items of expense were found to vary directly with the number of car-miles operated, while with others the expense does not vary with the service. For instance, much of the expense incident to the way and structure maintenance for rail service is due to the elements, irrespective of the number of cars operated if the same operating efficiency is maintained at all times. For this reason the maintenance figures per car-mile for track include a fixed expense of $466.66 per mile of route, a total of $1,400 to cover the cost of removal of snow and ice, cleaning and sanding track, etc. Electric line maintenance, likewise, includes $166 per mile of route, or $500 to cover the cost of painting poles, repairs to broken wires and damage caused by storms.

The allowances for superintendence of equipment, for transportation and for general and miscellaneous expenses represent the practice of up-to-date operating electric railway companies. This service was taken as being a part of a co-ordinated system.

TABLE II—UNIT COSTS USED IN CALCULATING COST OF SERVICE

	Unit	Motor Bus	Trolley Bus	Safety Car
Way and Structure Accounts:				
Highway expense	Route-mile	$75	$75	....
Track maintenance and bonding				
Fixed expense	Route-mile	....	....	$466
Variable expense	Vehicle-mile	....	....	0 9 cents
Electric line maintenance				
Fixed expense	Route-mile	....	$166	$166
Variable expense	Vehicle-mile	....	0.4 cents	0.3 cents
Maintenance buildings, fixtures and grounds	Investment	2 per cent	2 per cent	2 per cent
Depreciation track	Investment	....	....	4 per cent
Depreciation electric lines	Investment	....	6 per cent	6 per cent
Depreciation of buildings	Investment	2 per cent	2 per cent	2 per cent
Equipment Accounts:				
Superintendence	Vehicle-mile	1.6 cents	1.6 cents	1.6 cents
Maintenance of vehicles	Vehicle-mile	5.0 cents	3.0 cents	2.0 cents
Service equipment maintenance	Total	$100	$100	$100
Shop equipment maintenance	Total	$100	$100	$100
Shop expenses	Vehicle-mile	0.3 cents	0.3 cents	0.3 cents
Depreciation vehicles and equipment	Investment	12 5 per cent	12.5 per cent	8.333 per cent
Depreciation shop equipment	Investment	10 per cent	10 per cent	10 per cent
Power Accounts:				
Gasoline—wholesale Unit cost	Gal.	22 cents	....	....
Gasoline consumption	Miles per gal.	7.0	....	....
Lubricants	Bus-mile	0.4 cents	....	....
Cost of power, at 2½ cents kw.-hr.	Vehicle-mile	....	3.16 cents	3.62 cents
Conducting Transportation:				
Superintendence	Vehicle-mile	1 3 cents	1.3 cents	1.3 cents
Wages of operators	Man-hour	65 cents	65 cents	65 cents
Cleaning and washing	Vehicle year	$100	$100	$100
Other transportation expenses	Vehicle-mile	Balance to make 0 5 cents per mile with cleaning and washing		
Traffic expenses—Advertising	Vehicle-mile	0.16 cents	0.16 cents	0.16 cents
General and miscellaneous expenses	Vehicle-mile	3.9 cents	3.9 cents	3.9 cents
Taxes on physical property	Investment	2 per cent	2 per cent	2 per cent
State license	Vehicle	$50	....	....
City permit or car license	Vehicle	$25	....	....
Fixed charges—interest	Investment	7 per cent	7 per cent	7 per cent

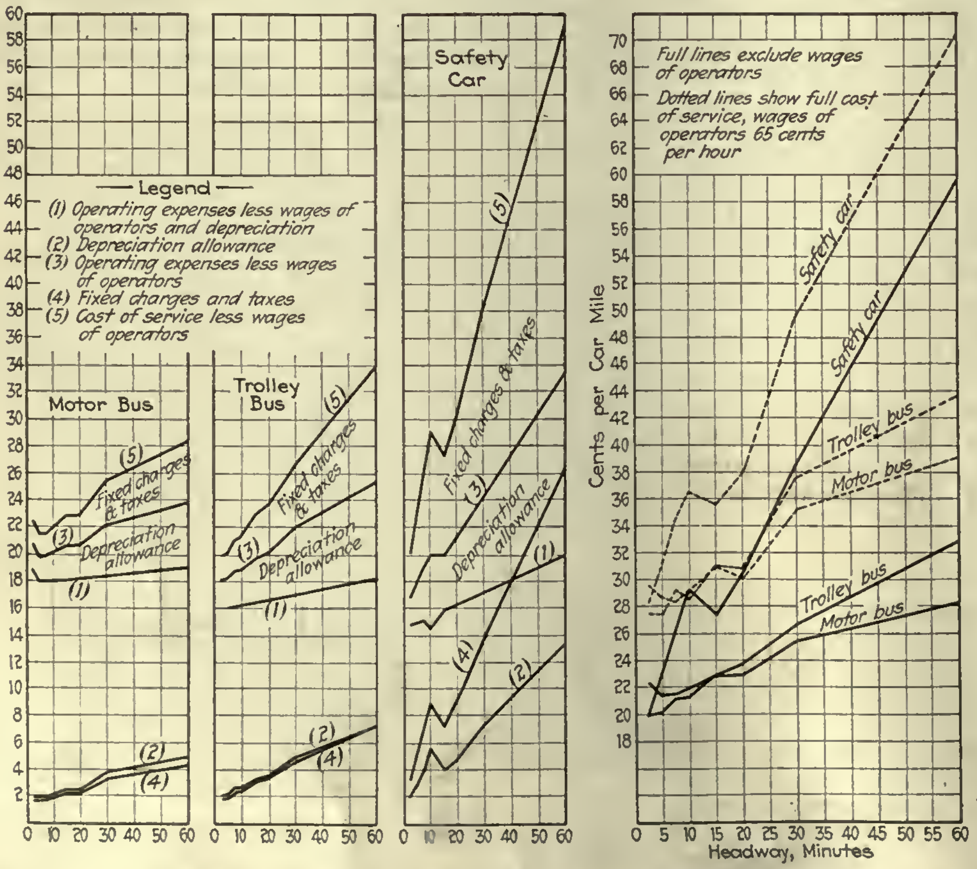
TABLE III.—ANALYSIS OF COST OF SERVICE ON A 3-MILE EXTENSION

	Motor Bus	Trolley Bus	Safety Car	Motor Bus	Trolley Bus	Safety Car	Motor Bus	Trolley Bus	Safety Car	Motor Bus	Trolley Bus	Safety Car
Headway (minutes)	60	60	60	30	30	30	20	20	20	15	15	15
Mileage run per year	39,420	39,420	39,420	78,840	78,840	78,840	118,260	118,260	118,260	157,680	157,680	157,680
Car-miles per car-hour	6	6	6	6	6	6	9	9	9	8	8	8
Necessary vehicles	2	2	2	3	3	3	3	3	3	4	4	4
Revenue seats	29	29	30	29	29	30	29	29	30	29	29	30
Revenue seat-miles	1,143,180	1,143,180	1,182,609	2,286,360	2,286,360	2,365,200	3,429,540	3,429,540	3,547,800	4,572,720	4,572,720	4,730,400
Dead time in schedule	40%	33⅓%	30%	40%	33⅓%	30%	8⅓%	None	None	20%	11.1%	6⅔%
Total investment	$17,700	$32,200	$115,200	$26,550	$41,550	$122,550	$26,550	$46,050	$122,550	$35,400	$55,400	$129,300
Cost of Service (cents per vehicle-mile):												
Maintenance of way and structures	0.647	2 315	6.095	0.342	1.376	3 667	0.228	1.051	2.845	0.181	0.888	2.443
Depreciation of buildings	.076	.076	.076	.057	.057	.057	.038	.038	.038	.038	.048	.038
Depreciation of track	....	....	9 132	....	....	4 566	....	....	3.044	....	....	2 283
Depreciation of electric line	....	2.055	1.598	....	1.027	.799	....	.914	.533	....	.685	.399
Total way and structures	0.723	4.446	16 901	0.399	2.460	9.089	0.266	2.003	6 460	0.219	1.621	5.163
Maintenance of equipment	8.908	6 908	4 408	8.564	6 654	4.154	8.570	6.570	4.070	8.526	6.526	4.026
Depreciation of vehicles	4.756	5.073	2.537	3.658	3.805	1.903	2.379	2.537	1.268	2.378	2.537	1.268
Depreciation of shop machinery	.127	.127	.127	.095	.095	.095	.063	.063	.063	.063	.063	.063
Total equipment	13.791	12 108	7.072	12.317	10.554	6.152	11.012	9.170	5.401	10.967	9.126	5.357
Power	3.543	3 160	3.620	3.543	3.160	3.620	3.543	3.160	3.620	3.543	3.160	3.620
Conducting transportation	12.641	12.641	12.641	12.633	12.633	12.633	9.022	9.022	9.022	9.925	9.925	9.925
Traffic	.160	.160	.160	.160	.160	.160	.160	.160	.160	.160	.160	.160
General and miscellaneous	3.900	3 900	3 900	3.900	3.900	3.900	3.900	3.900	3.900	3.900	3.900	3.900
Total operating expense	34.758	36.415	44 294	32.952	32.867	35.554	27.903	27.415	28.563	28.714	27.892	28.125
Taxes	.898	1 634	5.845	.674	1.054	3.109	.449	.779	2.073	.449	.703	1.640
Licenses and permits	.380	....	....	.285	....	......	.190	....	....	.190	....	....
Fixed charges	3.143	5.718	20 456	2.357	3 688	10.882	1.571	2.726	7.254	1.572	2.459	5.740
Cost of service	39.179	43.767	70 595	36.268	37.609	49.545	30.113	30.820	37.890	30.925	31.054	35.505

Ample allowances have been included for depreciation. Buildings were assumed to have a life of fifty years, track structures twenty-five years, electric lines sixteen and two-thirds years. The life of the motor bus and trolley bus was taken at eight years, while that of the safety car was assumed to be twelve years. Shop tools and machinery were estimated to last ten years.

The estimates for power are based entirely on purchased power at a rate of 2¼ cents per kilowatt-hour at the car so as to forego the necessity of calculating power plant and substation costs. Power consumption was figured at 1.4 kw.-hr. and 1.6 kw.-hr. per mile respectively for the trolley bus and safety car. These figures are predicated on 250 watt-hours per ton-mile for the rubber-tired vehicle as against 200 watt-hours per ton-mile for the safety car. Gasoline consumption for the motor bus was estimated at 7 miles per gallon at a wholesale cost of 22 cents per gallon.

Separate schedules for each of the several headways taken were figured for each mode of transportation. The schedule speed, however, was taken at 10, 9 and $8\frac{4}{7}$ miles per hour for the motor bus, the trolley bus and the safety car respectively. This gives a one-way trip in eighteen, twenty and twenty-one minutes. It was assumed that the rail-less vehicle, due to its greater mobility, could hold a faster schedule than the safety car. The schedules as assumed are shown in the accompanying diagrams. From these diagrams it will be noted that for each of the headways the actual speed in miles per hour for each of the three vehicles is the same until the headways are reduced to seven and one-half minutes or less; then, due to the difference in speed and layover time necessary, the car-miles per car-hour for both forms of rail-less vehicles are greater than for the rail-borne safety car.



Graphical Analysis of Items Involved in the Cost of Service

Operator's wages were taken at the same rate for each form of vehicle, for it

TO AN EXISTING TRANSPORTATION SYSTEM FOR VARIOUS HEADWAYS

Motor Bus	Trolley Bus	Safety Car	Motor Bus	Trolley Bus	Safety Car	Motor Bus	Trolley Bus	Safety Car	Motor Bus	Trolley Bus	Safety Car	
10	10	10	7½	7½	7½	5	5	5	2½	2½	2½	Headway (minutes)
236,520	236,520	236,520	315,360	315,360	315,360	473,040	473,040	473,040	946,080	963,326	952,971	Mileage run per year
9	9	9	9.6	8	8	9	9	8	9	8.625	8½	Car-miles per car-hour
5	5	5	6	7	7	9	9	10	18	19	20	Necessary vehicles
29	29	30	29	29	30	29	29	30	29	29	30	Revenue seats
6,859,080	6,859,080	7,095,600	9,145,440	9,145,440	12,460,800	13,718,160	13,718,160	14,791,200	....	27,936,454	28,589,130	Revenue seat-miles
10%	None	None	4%	11.1%	None	10%	None	None	10%	4.16%	5%	Dead time in schedule
$44,250	$64,750	$237,750	$53,100	$83,450	$252,350	$79,650	$102,150	$274,500	$159,300	$196,650	$348,000	Total investment
												Cost of Service (cents):
0.127	0.738	2.035	0.099	0.663	2.836	0.077	0.583	1.634	0.052	0.507	1.431	Maintenance of way and struct.
.032	.032	.032	.029	.033	.033	.029	.029	.032	.029	.029	.032	Depreciation of buildings
....	....	3.044	....	....	2.283	....	....	1.522	....	....	.756	Depreciation of track
....	.457	.533	....	.342	.400	....	.228	.266	....	.112	.132	Depreciation electric line
0.159	1.227	5.644	0.128	1.038	4.552	0.106	0.840	3.454	0.081	0.648	2.351	Total way and structures
8.494	6.484	3.984	8.464	6.464	3.964	8.442	6.442	3.940	9.420	6.420	3.920	Maintenance of equipment
1.982	2.114	1.057	1.784	2.220	1.110	1.790	1.903	1.059	1.783	1.971	1.050	Depreciation of vehicles
.053	.053	.053	.047	.048	.055	.048	.048	.053	.047	.049	.052	Depreciation of shop mach'y
10.529	8.651	5.094	10.295	8.732	5.129	10.280	8.393	5.052	11.250	8.440	5.022	Total equipment
3.543	3.160	3.620	3.543	3.160	3.620	3.543	3.160	3.620	3.543	3.160	3.620	Power
9.022	9.022	9.022	8.570	9.925	9.925	9.022	9.022	9.925	9.022	9.336	9.782	Conducting transportation
.160	.160	.160	.160	.160	.160	.160	.160	.160	.160	.160	.160	Traffic
3.900	3.900	3.900	3.900	3.900	3.900	3.900	3.900	3.900	3.900	3.900	3.900	General and miscellaneous
27.313	26.120	27.440	26.596	26.915	27.286	27.011	25.475	26.111	27.956	25.644	24.835	Total operating expense
.374	.548	2.010	.338	.529	1.600	.337	.431	1.160	.337	.407	.732	Taxes
.159	....	....	.142	....	....	.143	....	....	.142	....	....	Licenses and permits
1.309	1.916	7.036	1.178	1.852	5.602	1.179	1.511	4.062	1.180	1.422	2.550	Fixed charges
29.155	28.584	36.486	28.254	29.296	34.488	28.670	27.417	31.334	29.615	27.473	28.117	Cost of service

is believed that those who are operating with one man per car would have to pay the same rate irrespective of the form of vehicle. The base rate was taken at 60 cents per hour, with 5 cents per hour added for loadings such as pull-in and pull-out time, making out reports and the like. This wage figure is, however, subject to many variations due to purely local conditions which are not at all universal.

As will be noted, there is considerable leeway or layover time in many of the schedules, while in some cases no layover time is allowed. In actual operation tight schedules are difficult to maintain, but in view of the fact that this study is of operation on an extension and not through central business districts where delays might be encountered due to vehicular traffic, it is believed that these tight schedules are feasible.

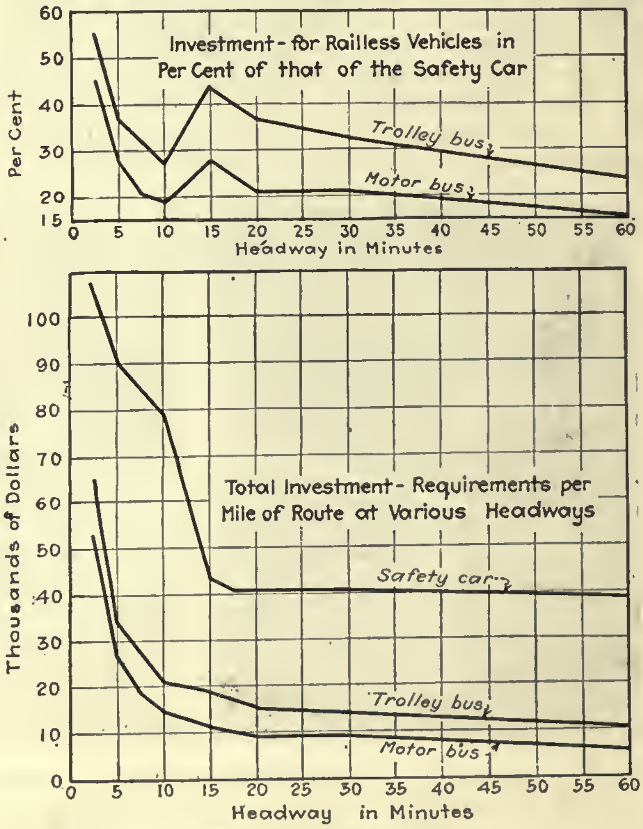
Working from these assumptions to determine the cost of service, the results shown in Table III were obtained. The results are also shown diagrammatically, the costs for each class of service being plotted to the same scale so as to show more readily the variations that exist in the three modes of transportation.

CONCLUSIONS

From an analysis of the curves it is evident that under the conditions assumed the relative fields for the use of these three different forms of transportation, namely, the motor bus, the trolley bus and the safety car, are distinctly divided. Two sets of curves showing the cost of service, with and without wages of operators, are given for the purpose of pointing out what an important part this expense bears to the total cost of service for each vehicle.

The field of the motor bus appears to be the most varied. It is apparent that on schedules with headways of fifteen minutes or more calling for a maximum of 116 seats per hour in each direction the motor bus on the basis assumed can be operated more cheaply than the other types of vehicles. It has a field of its own in the exploitation of new routes, and in addition, even with this seemingly small number of seats per hour, it is believed that there are many places in and around traction centers where such service would be welcomed.

The trolley bus has its field of operation in between that of the motor bus and safety car. It is but natural to believe that as the traffic increases and a larger investment is warranted the cost of operation should decrease and so pay the larger fixed charges rendered necessary. The trolley bus appears to be able to accomplish this. Its cost of operation is lower than the motor bus for headways below fifteen minutes, but for headways of less than two and one-half minutes, or where more than 696 seats per hour are required in each direc-



Investment per Mile of Route

tion, rail-borne service can be operated more cheaply. This analysis is based on the assumption that road vehicles will not be subjected to any road tax above the usual license fees which have already been included. If such a tax should be imposed, the relative economies of the different modes of transit would be changed.

Any individual operator can easily substitute for the assumptions made actual cost figures to fit individual conditions. Such a substitution might vary the conclusions considerably, especially if a different length of route were taken and the operating conditions were such that the schedules as laid out could not be maintained with more or less layover time.

Credit for collaboration in the preparation of this article should be given to Albert S. Richey, electric railway engineer, Worcester, Mass. All of the assumptions used and the method of calculation followed were agreed upon after conference.

Another Trolley Bus Tested

Details Follow in All Essential Features the Specifications Issued by the Detroit Street Railway Department, Which Incorporated Some Novel Features

TESTS on an improved new type of trackless trolley car or trolley bus, manufactured by the Trackless Transportation Corporation of New York, were completed last week at the General Electric Company's plant, Schenectady, N. Y., where the electrical equipment is being installed. This new trackless trolley will shortly be placed in operation in Detroit by the officials of the Municipal Railway and will be used for demonstration purposes. It incorporates a number of new features both in design and operation not found in any previous bus installation.

The bus demonstrated at Schenectady is an adaptation of electric drive to the standard low center of gravity gasoline motor bus built by the Trackless Transportation Corporation. The driving motors and control are placed beneath the hood. The collector consists of a standard U. S. trolley base, a 14-ft. Shelby seamless steel trolley pole with a double-contact sliding-type collector head. This collecting head is swiveled on the pole and provides sufficient flexibility for making close contact with the overhead under all service conditions.

The main dimensions of the bus are: Length from spring horn to back of body, 25 ft.; wheelbase, 183 in.; over-all width, 88 in.; over-all height, 8 ft. 2 in. loaded and 8 ft. 4 in. light; weight 10,700 lb.

The chassis is of pressed-steel frame with specially designed front axle and internal gear rear axle. The propeller shaft is equipped with service brakes and there are external drum-type brakes on the rear wheels for emergency.

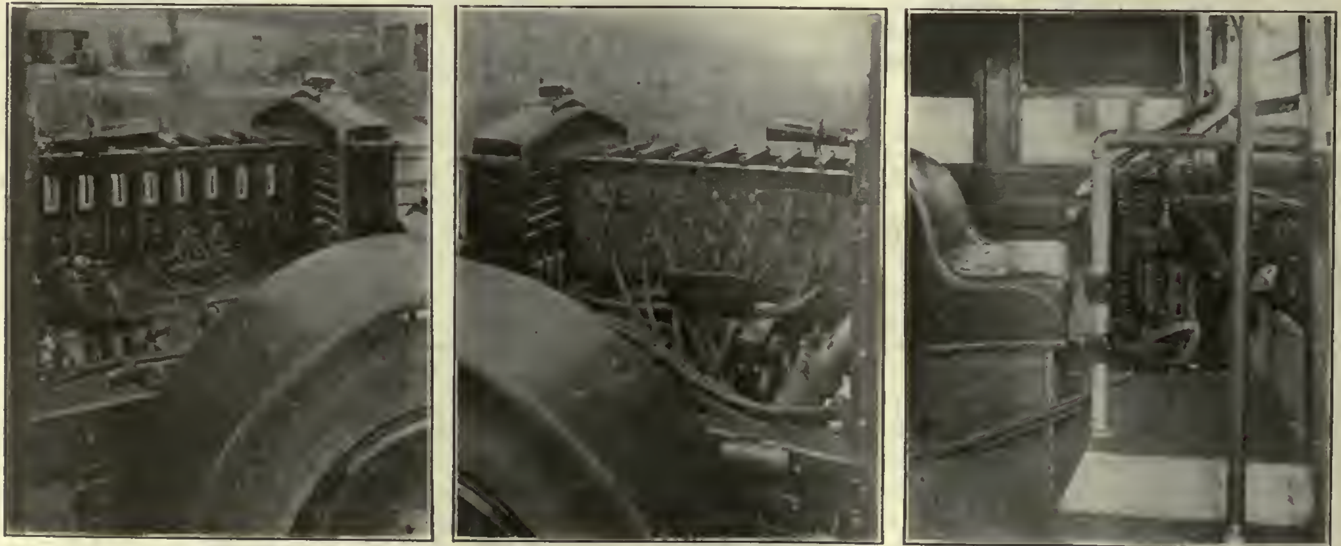
The driving mechanism consists of two 600-volt GE-258 railway motors connected in tandem and drives the standard rear axle through the usual universal joints. The maximum speed will be about 25 m.p.h.

The control is of the series-parallel type consisting of eight electrically operated contactors and a foot operated master controller of the non-automatic type. This allows the operator to select the most suitable speed for operation. The control has four steps in series and three in parallel, which is ample for starting easily without a hammer blow on the gearing or discomfort to passengers.

Overload protection is provided by two 600-volt cartridge fuses M.E.C. standard. Experience has proved that overload protection by means of circuit breakers is unsuitable to the trackless vehicle.

The following is a résumé of the principal facts about the Trackless Transportation Corporation's vehicle:

Seating capacity	29 passengers
Track of rear wheels	71 in.
Track of front wheels	66½ in.
Size of front tires	36x6 pneumatic
Size of rear tires	40x8 pneumatic
Height from ground to roof	8 ft. 2 in. pneumatic
Height from ground to floor (light)	27 in.
Height from ground to floor (loaded)	26½ in.
Inside width on seat line	82 in.
Inside length on seat line	20 ft., 5½ in.
Inside height from floor to ceiling	6 ft. 5 in.
Height from ground to step	16 in.
(10-in. riser on step—one-step and in`.	
Chassis interchangeable for gas or electric drive.	
Lighting 6-volt storage battery charged by automobile type generator belted to driving motors.	
Window posts, centers	29 in.
Width of seats	33 in.
Lights	Seven flush receptacles, step light destination light—tail light—two headlights.
Curtains	Standard Curtain Supply Company
Buzzer	Signal system standard.
Fare box	Standard



Views of Some of the Details of Detroit's New Trolley Bus

At left, right-hand side of the front with the hood removed, showing the method of arranging the contactors. The two GE-258, 600-volt railway motors in tandem can be seen immediately under the contactor hood. In center, left side of the front with the hood removed, showing the connections of the contactors, and the method of arranging the conductors in the small space allowed. At right, view of driver's seat, showing also the location of the controller and other operating apparatus.

Letters to the Editors

FOLLOWING *are given two further comments on the proposed reorganization of the American Electric Railway Association, which will be considered at the coming convention:*

Mr. Shannahan Recommends Open Field

PECK-SHANNAHAN-CHERRY INC.
HAMPTON, VA., Sept. 14, 1921.

To the Editors:

I have read with interest the letter of J. D. Mortimer regarding the proposed changes in the constitution and by-laws of the American Electric Railway Association, in which he states that the success of the association will depend rather upon the substance of its leadership than upon its form of organization.

It strikes me that it is entirely possible that the substance of its leadership will depend to a considerable extent on its form of organization, or, at least, upon the method pursued in creating the leadership. It is comparatively easy for the nominating committee to select a fourth vice-president for the ensuing year, but it is a more difficult matter for it to select a man to be president four years hence, which is exactly what is proposed to be done by the section of the constitution providing for the election of officers. It may be argued that the constitution as written does not necessitate the automatic promotion of the vice-presidents, but every one familiar with the facts knows that it has been the custom so to do, and frequently custom provides a more rigid law than the written statute. More than once during the past decade this custom has given difficulty, and why it should be perpetuated, rather than leaving the nominating committee free to select the man who at the moment most nearly meets the exigencies of the hour, is difficult to say.

Is it not a fact that striking the shackles from the nominating committee might result in the kind of leadership which would develop the forward looking policies which may so materially assist in the rehabilitation of the electric railway industry?

J. N. SHANNAHAN.

Comments from Mr. Shoup

SOUTHERN PACIFIC COMPANY
SAN FRANCISCO, Sept. 13, 1921.

To the Editors:

You ask me for some comments on the proposed A. E. R. A. constitution.

The changes in the constitution are of minor importance. Whether the association succeeds or fails depends upon the energy and thought its members put into the work, and particularly the officers who accept the direction of its affairs. If it is a constructive policy worth while, then the association is worth while and not otherwise. The form through which it operates, if practicable, is quite secondary to the operation itself.

It seems to me that the executive committee is too large. The privilege of a member of the executive committee to send a substitute is a doubtful one. A man is selected for such work because of his personal qualifications. His company is not elected. Would it not be better to have a smaller committee which carried the full responsibility and would be present at nearly all meetings?

The provision with respect to membership for trackless transportation companies ought to be carefully worded. If it should mean the admission of motor buses, I suspect that there will be trouble out our way.

The various changes that make for systematic and regular consideration of the problems confronting the industry are very good.

PAUL SHOUP,
Vice-President.

Railways Must Take Up Buses Now

MOUNT VERNON, N. Y., Sept. 15, 1921.

To the Editors:

Having returned from a couple of months study of the enormous development of the motor bus in Great Britain—from London's 2,700 working vehicles a day to the humblest countryside service—I find it harder than ever to understand those who vainly believe that in this country the motor bus is not going to get beyond the anarchistic jitney stage. It is true that electric railways will never be supplanted by this catch-as-catch-can or go-as-we-please service of the individual operator, although they can be and have been ruined by such competition. Yet there is no reason to suppose that the motor bus will always remain in the ragamuffin stage, for even the worst enemy of the electric railway recognizes that that stage must not be allowed to continue.

It does not seem that we will have to wait much longer for the motor bus to appear in much more dangerous form. Hitherto, when an electric railway has "downed tools" it has been able to fold arms calmly while a host of irresponsibles tried to fulfill its functions. Sooner or later an influential part of the public has seen the point and asked the electric railway to resume. But in several recent cases, a new phenomenon has appeared. Motor-bus projectors have definitely offered to replace all of the electric railway service at a fare below that which the electric railway management insists it must have. It is not my purpose here to analyze their figures, but simply to point out the appearance of a new and more dangerous competitor.

The electric railways must not be led astray by the fact that the operating expenses of a car-seat mile are, for so large a portion of the output, less than those of a bus-seat mile. The real question is: Can the financially unencumbered motor bus offer a lower rate of fare than an electric railway which is trying to carry the accumulated overhead and taxes of one or two generations? Apparently a well-organized bus system will be able to do so in many of the top-fare communities where the average length of ride is between 1 and 2 miles.

At least one thing is clear: Electric railways must hasten to secure all the bus rights possible before jitneys have been operating long enough to secure a vested interest in local mass transportation. The recent New Jersey bus measure which specifically exempts preexistent operators from seeking a certificate of public necessity and convenience illustrates what I mean by "vested interest." The right to run motor buses should not be confined to cross-town connections and extensions, but should be of such breadth that the electric railway system will be able to say truthfully that it is prepared to give any kind of mass transportation that can be obtained by either joint or separate operation of trackways and buses.

WALTER JACKSON.

Iowa Operating Men Meet

Claims Work from Legal Standpoint and Great Need for Co-operation of All Departments Discussed—Track and Equipment Men Talk About Their Problems and Bring Out Experience of General Interest

TRACKWORK, motor maintenance, problems of the transportation department and co-operation between all departments and the claims department were the subjects considered and freely discussed by the regular meeting of the Iowa Electric Railway Association held at Waterloo, Iowa, Sept. 15 and 16, and devoted exclusively to the operating men. Two papers dealing with the topics named appear elsewhere in this issue. The meeting was presided over by R. J. Smith, Davenport, on Thursday, in the absence of Chairman John Sutherland, Davenport, who, however, was present and presided Friday. At the conclusion of the convention Mr. Sutherland was unanimously elected to act again next year as chairman of the operating men's meeting for the third time.

M. A. Welsh, superintendent of transportation, Waterloo, Cedar Falls & Northern Railway, read a paper in which many aspects of the general transportation situation were reviewed.

In discussing Mr. Welsh's paper C. M. Feist, Sioux City, made the point, in relating the experience of his company with safety cars, that if a company can afford to buy standard Birney cars, this is the thing to do rather than to attempt to substitute rebuilt old type cars. He said that the additional cost of operating the rebuilt type in one year would go a long way toward purchasing the standard car. T. E. Woods, Omaha, Neb., said that the Omaha & Council Bluffs Street Railway now has in operation five standard safety cars which are used on five runs from 5 a.m. to midnight, so that the only chance the equipment department has to inspect them and maintain them is during the night, and the results have been very satisfactory.

Mr. Welsh reviewed the history of the difficulties in securing permission to operate one-man cars in Waterloo. One-man operation was finally made possible by an injunction secured against the newspapers preventing them from publishing an ordinance prohibiting the operation of such cars, an Iowa law providing that no ordinance shall become effective until published. The ordinance has never been published. The company operated remodeled cars with one man for six years prior to the purchase of standard Birney cars, with which the Waterloo city lines are now 100 per cent equipped. Later, a committee of the City Council went all over the country to take depositions on this subject, and after this study was made the City Council avoided responsibility by placing the matter directly to a popular vote, which overwhelmingly approved the one-man cars. Mr. Welsh made the comment that he believed that whatever sentiment was manifest against the one-man operation was largely manufactured by city officials and was not real or spontaneous, and that this applied not only to Waterloo but to many other cities. Mr. Welsh declared that the best defense against any claim is to prevent the accident, and that the safety car goes a long way toward doing this.

DISCUSSION OF CLAIMS WORK

In discussing the paper on co-operation between the claims department and other company departments by H. J. Connell, W. P. Thomas, Omaha, Neb., told of the experience of the Omaha company in endeavoring to impress the claims work upon student trainmen. He said they had formerly tried to teach the duties in this connection to the men during the period they spent in a training school, but that while the company had a competent instructor, the trainmen were more interested in learning the operating side of the business and they did not absorb a great deal of the claims side. The plan followed now is to have a representative from the claims department ride on the cars with the trainmen and go over actual cases with them to teach them wherein they should have done differently and to outline the various phases of this work, as well as to emphasize the method of avoiding accidents. Mr. Thomas said that this system of instruction on the claims work has been found to be much more successful than the instruction of the men in training school or in holding smokers or meetings at which these things are discussed. It was also brought out that the Omaha company had had good success in collecting damages from automobilists who had run into and damaged street railway property. Such cases had been undertaken only where the company had a clear case, and the outcome in every one has thus far been successful.

TRACK MAINTENANCE WORK

T. E. Rust, Waterloo, in discussing the paper on track maintenance by R. J. Smith, said that in maintaining the city lines in Waterloo the street railway had been largely in the position of having to wear out the cast-off equipment of the interurban system operated by the same company. He said that he was swinging back to the use of bolted work for railroad crossings and getting away from manganese special trackwork for the reason that, while the latter is good, it goes to pieces all at once when it has reached its life, while a bolted intersection can always be repaired and its life extended in emergency. In purchasing special trackwork the Waterloo company follows the practice of supplying two sets of drawings to the manufacturer, who is required to return one set with all of the drilling dimensions and locations marked on it, and this is then kept for the company's permanent record. Thereafter, when it is necessary to renew any piece, the drilling measurements are taken off the drawings, thus avoiding the necessity to make bolt-hole measurements in the field, which is very difficult to do. Mr. Smith raised the question whether any difficulty was found in following this practice, due to worn bolt holes and creeping of the rail with which the new piece must be connected. Mr. Rust explained that no particular difficulties of this nature had been found. He added that the greatest weakness in railroad crossing trackwork is in the bolts and that he uses nothing smaller than 1¼-in. treated bolts.

In building city track on gravel ballast Mr. Rust follows a plan of keeping the track open for about two weeks after it is constructed in order to permit the ballast and roadbed to settle. This is done mainly because of the fact that the company has no tamper. During this period while the track is kept open it is gone over to keep it to grade and alignment. This plan results in practically avoiding any settling of the pavement when the track is closed in. He said, however, that the use of a tamper is a better practice if one is available. Sometimes a heavily loaded car is run over this open track repeatedly to hammer it down and cause as much settling as possible before paving.

Mr. Feist brought up the question as to the cause of a number of broken rails which had been experienced in Sioux City in new track built with 80-lb. T-rail on steel ties and set in concrete, with the joints welded with a resistance type arc welder. Eight cases of broken rail occurred in the first eight months, the break taking place about 8 in. from the joint. Mr. Smith pointed out that this might be due to defective welding which altered the structure of the metal and made it unable to withstand the very high internal stresses set up in rail concreted in.

Turning to the subject of interurban track maintenance, Mr. Smith told of his experience with the use of weed killers. He said he had followed the theory of the manufacturers of the chemical, of using a heavy treatment the first year, a lighter treatment the second year, still lighter the third year, skip the fourth year, and then a light treatment each year, but this plan had not worked out satisfactorily. He though the results obtained depended much on the type of ballast and kind of weed, etc. The weather has been said to have a good deal of influence also on the effectiveness of the killer. Some contend that it should be applied after a long dry spell when the weeds are dry and will drink in the chemical. Others claim that it is better to apply the chemical in wet weather so that it soaks into the roots. Mr. Smith said he had come to the conclusion that it was very difficult to say which was the better plan, but that he was convinced that it is worth while to use the weed killer and that it saves a substantial amount of money as compared to the cost of removing the weeds by hand. His thought is that the labor that is used in weeding the line could thus be released for use in other much needed trackwork. He said that his company had skipped one season in using the killer and had regretted it.

As to the method of applying the chemical, he thought the scheme of spraying under pressure was better than the gravity sprinkling. The base of the chemicals used is arsenic. It has been very difficult to determine whether any sterilization of the roadway is secured from the use of the weed killer. Sometimes, when one predominating weed is killed off, while it does not reappear, it is promptly succeeded by another kind of weed. He said he knew of a five-year test made by a manufacturer which did not sterilize the ground, but he was satisfied that even in the absence of sterilization it was worth while on account of the saving in labor made possible.

Mr. Rust explained that the 60-mile line from Waterloo to Cedar Rapids had been treated with weed killer on July 1 of this year, and that while the growth of weeds was very dense and rank, the roadbed was thoroughly cleaned up. However, a certain amount of regrowth was appearing by the end of August. None of those present who had had experience with weed killers could say that it had any bad effect on the ties.

DIPPING AND BAKING OF ARMATURES

Frank R. Grant of the Westinghouse Electric & Manufacturing Company, Des Moines, Iowa, presented a paper describing methods used and results obtained from dipping and baking railway motors.

Mr. Feist, in discussing Mr. Grant's paper, took the position that he was unable to see how dipping and baking of motors by the Sioux City Service Company would represent a saving. He cited a rather remarkable motor service record. The records of the company show that on ninety-six motors of one type in use for ten years a total of fifty-nine sets of coils have been used. On seventy-six motors of another type, also ten years old, nineteen sets of armature coils has been used. These two instances are at the rate of, respectively, six and two armature failures a year for ten years.

R. H. Llewellyn, general foreman in the shops of the Waterloo, Cedar Falls & Northern Railway, told of the experience he had in dipping and baking armatures during the last three years. Trouble was had at first when the armatures were dipped with the commutator end down, due to the hot varnish leaving pockets behind the risers, in which dirt and copper dust collected, forming a paste and causing trouble. The practice now followed is to dip with the pinion end down, a clamp for the commutator end having been made to handle armatures in this manner. During the baking process the armatures are rolled to prevent the varnish from running to one side. They are baked for thirty-six hours at 165 deg. C. and then painted with a light coat of varnish and baked twenty-four hours more. In the last three years six motors have failed because of loose connections at the risers and this difficulty has been eliminated by the use of a spongy compound furnished by the Westinghouse Electric & Manufacturing Company to pack in the leads. The practice followed by the Waterloo company is to wrap the armatures and bake them for twelve hours before banding. This is done to get the coils thoroughly moistened and flexible before the banding and final dipping. Another practice is to avoid soldering the clips on any one band consecutively. To do so causes the band to become too hot and expand, allowing a slippage of the coils. The practice followed is to solder a clip at a time on each band, giving the band a chance to cool off before the next clip is soldered on that band.

Mr. Llewellyn said that the Waterloo company is not having one-fifth the trouble with armatures now that it did before it began the practice of dipping and baking armatures. There is one bad feature that if a failure does occur it is necessary to rewind the whole armature on account of the stiffness and hardness of the coils. Another advantage of the process, however, is that the hard varnish prevents trouble when a flashover occurs between the commutator and case.

W. B. Brooks, Westinghouse Electric & Manufacturing Company, said that his company knew that the dipping and baking process is a success because of the material falling off in the sale of coils. A question had been raised by two members about the value of this process in eliminating moisture, they having stated that the dipping had a tendency to trap moisture and seal it in. Mr. Brooks replied that this was not a very pertinent point because the percentage of armatures lost because of moisture was very small. Motors in service will dry themselves out. He explained that the main object in dipping and baking is to do away with vibration, which is the big cause of trouble. The main reason for dipping as against rolling, painting or spraying is simply that it involves less labor cost. He also explained that the heat-radiating ability of a dipped and baked armature is much greater. Mr. Wood, Omaha, Neb., and Mr. Sutherland, Davenport, reported very good success with the dipping and baking practice. No one present was able to supply any good figures as to the cost of dipping and baking.

The delegates to the convention were the guests of C. D. Cass, general manager Waterloo, Cedar Falls & Northern Railway, for luncheon, and thereafter were taken on a special two-car train for a trip to Cedar Rapids and back over the company's 60-mile high-speed line. At Cedar Rapids the party visited the shops of the Cedar Rapids & Marion City Railway, and made a tour over several lines of the city property under escort of E. C. Allen, general manager. In the evening a banquet was held at the Russell-Lamson Hotel, Waterloo, at which entertainment was afforded by very splendid local talent.

The Relation of the Claim Department to Other Departments

BY H. J. CONNELL
Trial Attorney Omaha & Council Bluffs Street Railway

GIVEN the best organized street railway company conceivable, it goes without saying that there must, as a matter of necessity, exist between the claim department and each and every other department of the company a close inter-relation and interdependence. These characteristics may exist with little or no co-operation between the claim and other departments, but without some co-operation existing the organization is absolutely doomed, sooner or later, and generally quickly, to failure. It is an easy matter to say that co-operation is necessary. If I make no other point clear, let me drive home the proposition that two great factors, understanding and co-operation, are absolutely essential to the success and very life itself of the corporation's existence.

I have noted at different times in some organizations the existence of petty jealousies between different departments. Suggestions or recommendations from one department to another may be looked upon as interference with authority, and received, therefore, with disfavor and without the accomplishment of the good which the merit of the suggestion may justly deserve. This is not teamwork. The natural pride which the head of a department should have is to welcome any suggestion or plan which may improve the efficiency of his unit, even though the idea was born in the mind of a man not connected with his own organization.

It is just as important for the su-

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*Abstract of paper presented before Iowa Electric Railway Association at Waterloo, Iowa, Sept. 15, 1921.

perintendent of transportation to be an ideal claim man as it is for him to be an ideal operating manager. The claim and transportation departments are more closely identified than any two other departments. They should work hand in glove. The aim of one should be the aim of the other, the methods employed the same for both.

There is a question of whether the claim department or the transportation department should assume the task of instruction. In my opinion, the instructor should be a competent, trained man, taken directly from the ranks of practical operating men, knowing everything about a car and how to run the thing, and knowing also everything about accidents, how to prevent them as far as possible, and what to do after one has occurred. The instruction department should be under the direction not of the claim department, but of the operating or transportation department. But the claim department should be constantly consulted and should be constantly offering suggestions when new situations arise, so that the instructor can be kept up to the minute on every phase of accident work.

I have always advocated a follow-up system of instruction, under which the men at different intervals of time are taken off the cars for a freshening up on accident work. This can be done either by the original instructor or in talks to the men by someone connected either with the legal or claim department who is fully equipped for the task, and by regularly posted bulletins, keeping the men in touch on the bulletin board with new features arising in claim work. Our company had inaugurated, prior to the war, a system under which the men were brought in at intervals and polished up on their accident information. However, due to the emergency situation during the war, and the unsettled labor conditions following that period, this policy was necessarily abandoned, and at the present time we are somewhat weak along this line and are left again to another feature of co-operation between the claim and transportation departments.

Whenever an accident is reported inaccurately, or without sufficient detail, the matter is immediately referred to the transportation department, whereupon the erring employee is given a hearing by the superintendent. The same procedure is followed where it appears that the motorman or conductor were apparently negligent in an accident. In this way a constant check is kept on the men at large and it is seldom that a man is found wanting more than once in the same particular. Were the claim agent to sit back, satisfied in his false security, only to take care of the claims that come to his office, without turning a hand to remedy conditions requiring attention, or to co-operate with the transportation department in this check-up or follow-up system, he would not be fulfilling the ideals which should rightly belong to his office, and he would be working toward the injury, rather than the betterment of his employer. I think it very essential that a lively interest among the employees in accident prevention and in accident cure should constantly be maintained, and among the small companies the job is less difficult than where a large number of employees are on the pay roll. Every day new and different kinds of accidents are occurring which before had never been thought of by even the most experienced. Striking examples of such class of accidents brought to the attention of the men, with suggestions how they could have been avoided, tend toward the maintenance of a constant vigilance on their part, are very helpful and instructive and at the same time keep up the *esprit de corps* of the organization. The system just referred to requires the utmost co-operation between the two departments.

CO-OPERATION OF OTHER DEPARTMENTS NEEDED TOO

The same considerations that apply to the relation between the claim and operating departments apply with equal force and effect to the relationship of the claim department to the other departments enumerated in the subject of this discussion. An unsafe switch, wye or crossing, where cars have jumped the track, is first detected by reports received by the claim department of similar accidents occurring over a course of time at the same location. Without co-operation the track department might remain in total ignorance of the defective condition for a consideratble period of time. Accidents and claims otherwise avoidable would be multiplied.

Some accidents are unavoidable and cannot be anticipated or guarded against. An example of this occurs to my mind in the case of a pedestrian on the street crossing behind one of our cars just entering a curve. The trolley wheel jumped the wire, ran up over a trolley hanger, became fixed and lodged thereon, the trolley pole was wrenched free from the socket of the trolley base and fell to the street, striking the pedestrian upon the head and inflicting a very serious fracture of the skull. Claimant, of course was innocent and free from negligence. What was the cause of the accident? Was there negligence on the part of the company?

Investigation disclosed that had the trolley pole been more securely fastened in the socket the whole trolley base might have been wrenched from the car. We have had examples in our experience of this nature of accident. It was disclosed that the trolley pole was fastened securely enough to permit its use safely for all practical purposes. The overhead trolley construction did not give way, which might have been the case had the pole not been wrenched free. Then came the question as to the trolley frog and hanger involved in the accident, and it was developed that these two instrumentalities were of the latest improved type, both from a mechanical and safety standpoint. They were the best on the market and had been selected not only for their efficiency in operation but also from considerations of safety and accident prevention. Our superintendent of electric lines has been in close touch with accident work and with accident prevention, and the result of the trial of the case in question championed the cause of co-operation and proved that where it exists the company has but little to fear.

We brought into the courtroom every appliance on the car and in the overhead trolley system which was connected with this accident and exhibited them to the jury, explained their construction and the use to which they were put. The plaintiff had alleged defective and unsafe construction and when our evidence was complete was at a loss to find one point upon which to base an argument of negligence on the part of the company. Our offer to claimant before trial was in the sum of $7,500, for we realized the seriousness of the injury and feared the effect of sympathy and prejudice. The verdict of the jury, in the same amount as our offer, was the talk of court house attaches for several weeks. Needless to say, the amount of the judgment was paid into court within three days and the case disposed of. Had there been defective trolley construction, I have no doubt that the verdict would have reached the sum of $20,000 or more.

Closed doors on the rear and front platforms of all cars operated by the company have reduced to a minimum the boarding and alighting accidents, much dreaded in former years. The closed door construction has been the result of numerous conferences between the different departments and a strong advocacy in favor of their use by the legal and claim departments.

Not a long time ago headlights on the cars were insufficient on a dark night for the motorman to distinguish a vehicle stalled on or near the track within sufficient distance, in all cases, to stop the car and avert a collision. Improved headlights now in use have practically eliminated this class of accident and are the result of constant poundings on the part of the claim department. Examples of possible cooperation are legion. I cite these few merely to illustrate my point.

RELATIONS BETWEEN LEGAL AND CLAIM DEPATRMENTS

A modern lawyer who is equipped to handle for the company in court the damage suit, so full of possible traps and pitfalls for a corporate litigant, may, if he is not duly cautious, look upon himself as a sort of little tin god on wheels and become imbued with the idea that all information should be served to him on a silver platter, and that investigations of accidents are within the province only of the humble claim agents and their assistants. In the dignified isolation of such superiority he will sooner or later be confronted with a situation with which even his eminent learning and ability cannot cope. If you know any such fellow in your organization advise him to come off his perch. He must, in order to be fully armed, keep himself constantly in active touch with all the details and workings of the claim department. He is the surgeon called by the company to attend its case. He must look for his supply of medicines, dressings and surgical instruments to the claim department, which is the source. He must, for efficiency, be informed with the history of the case from the time the accident first occurred down to the last instruction to the jury, and exception taken. He cannot acquire this knowledge unless he is at all times within reach of the claim department. My experience has shown me that there is no measurement for the aid and assistance to the trial attorney which comes to him from knowing the nature and progress daily of the investigation of the individual accident. In every major or serious accident he should be on the ground before the debris has been cleared away. He should take note of all physical evidences remaining after the accident. He should immediately suggest to the claim department such lines of investigation as may occur to him to be proper for the preparation of a successful defense.

Only last week, in our city, an individual who had partaken in unsafe quantities of the "cup that cheers" attempted, while driving a flivver, to pass a street car going in the same direction, and in so doing struck an automobile parked at the curb, with the rather unexpected (to him) results that his automobile was overturned some one hundred feet further down the street, effecting, for other occupants of his flivver, a fractured skull, a broken back, a fractured arm and minor injuries. The police department informed our company of the accident immediately, for the reason that on more mature reflection the driver claimed in an incoherent fashion that the street car had run into him. Our claim department was already at work upon investigation, for the motorman had called the carhouse foreman, who had in turn immediately notified the claim department. It was disclosed that our company was neither directly nor indirectly involved and that the street car had not so much as touched the unfortunate flivver. Within three hours after the accident notice of the same was in the hands of the legal department and the writer personally called at the police station to interview the driver. He was still intoxicated, despite his vehement claims to the contrary and even went so far as to assert that he hadn't "had a drop." The day following the accident two suits, each for $50,000, were filed against this company.

Am I not better qualified, six months or so from this date, to defend successfully these cases, than I would be in the situation that immediately before trial the files were first presented to me and I noted from some written statements or memorandums, long since "cold," that probably the driver was drunk, and that at least one or two persons were of the opinion that he was drunk? I, the fellow upon whom will later devolve the task of proving it, know now, personally, he was intoxicated. From my personal observation and information derived from the investigation I know now just how the accident occurred.

We are all human, none of us perfect. The best that we can do is constantly to strive in our personal and business life toward perfection. If I could leave with you one thought the observance of which will tend toward the reduction of accidents, or the preparation of successful defenses thereon after they have occurred, I could originate no better slogan or standard than that contained in the following three words:

"Knowledge — understanding — co-operation."

Knowledge, thorough and complete, on every phase of the accident question; understanding, of what to do, when to act and where, before, if possible, if not, after, the accident has happened; co-operation between each and every department in the organization, co-operation which is unselfish, whole-hearted and without stint or compromise. If these qualities are instilled in every cog of our great machine from the president of the concern down to the lowliest messenger boy we shall soon find ourselves almost within reach of that enviable position of a certain claim agent whose motto, hung and emblazoned in large letters in his office, greeted the eye of every claimant calling there, and bespoke the following trite, concise and independent message, "Not a Damn Cent."

Track Maintenance and Construction Kinks*

By R. J. Smith

General Manager and Engineer of Way
Tri-City Railway, Davenport, Iowa

CONDITIONS prevalent in the street railway industry during the past five years have so reduced track forces that roadbed has been allowed to wear out faster than it could be maintained. Due to this fact, track forces have become little more than emergency gangs, temporarily repairing track which has caused derailment.

Various expedients have been employed in the Tri-Cities to effect economies in the maintenance of special trackwork. Last winter a tongue in an old Pennsylvania pinless switch broke about 6 in. from the heel. A pattern was made in our repair shop and taken to a local steel foundry, where a new tongue was cast of electric steel. Very little grinding was necessary on this casting. It was installed Jan. 6, 1921. Today it shows practically no wear. The pattern cost $13 and is available for future use at several other locations where the same type and size of tongue is in service. The casting cost $20, while a new manganese tongue would have cost $56.

A number of hard centers set in spelter with rapid renewable bolts in iron-bound manard construction special work became loose. They were repaired without spelter by shimming them to the proper level with triangular shims and tightening with new bolts. After the cars had run over them a few days they were again tightened and the holes filled with hot asphalt. After several months they still remained tight and are giving good service. In a few cases it has been necessary to replace the hard center. A ¾-in. plate the size of the old center was used, to which were riveted small pieces of ¾-in. plate in such a way as to make the throat-way for the wheel flanges. They were raised to the proper level by shimming in the manner described above and welded to the ends of the rail in the casting. This work cost $15 as compared with $50 for a new manganese center.

At several special work locations frogs have broken or worn out completely, and since no new ones were available it has been necessary to manufacture them in our own small construction shop. Such frogs were made of high T and girder-grooved rail. Accuracy in obtaining the proper curvature was secured by using a templet made of two strips of wood ½ in. thick, nailed together and sawed out to conform to the proper angle and curvature. Rails of correct length were bent and the top half of one rail and the lower half of the other rail cut out with a torch where they intersect. They were then welded to a base plate 24 in. x 36 in. x ¾ in. Plates were also welded to the web of the rail and the throat-way ground out with a track grinder. The total cost of these frogs was from $50 to $80, and they are giving very good service after a year's wear. Bolted T-rail frogs have been repaired at a cost of $20. For making these home-made frogs it is very desirable to have a plane table built of rail and concrete, but as yet we have not been able to construct such a bed and have contented ourselves with laying out some T rail at 14 in. centers upon a support of timbers about 30 in. high. A small swinging crane constructed of T rail was rigged up upon a post adjacent to this table.

Broken running and bearing rails on steam road crossings have been removed and new rails installed in their places. Until recently, bolt holes in the rails were burned in with an oxy-acetylene cutting torch. However, in the case of high-carbon open-hearth rails, this burning of holes is detrimental to the metal in the web, so that whenever the time permits we are drilling the holes in the repair shop on a press, the proper spacing being secured by the use of a templet.

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*Abstract of paper read before Iowa Electric Railway Association at Waterloo, Iowa, Sept. 16, 1921.

Very little construction or even reconstruction of track has been done on our properties in the last few years. Briefly, our practice is this: Standard construction consists of 7-in., 80-lb. T-rail laid on creosoted red oak ties, spaced 2-ft. centers with 8 in. of crushed stone under the ties. Where it is possible the subgrade is rolled with a 15-ton roller. A 6-in. layer of stone is laid and rolled, then the track constructed upon this ballast bed. After the track is spiked and the joints welded it is filled with stone to the top of the tie and then tamped to grade by a four-tool electrically driven air tamper. Before the track is concreted regular car service is permitted to operate over it for a period of two or more days, depending upon the frequency of service. Then the track is tamped a second time, which requires about half the time used in the first tamping. The paving base consists of a 5-in. layer of 1:3:6 mixture of concrete. Brick are laid on a 1-in. 1:4 grout bed and filled with a 1:2 grout. All paving is covered with sand to prevent too rapid drying of the filler, and vehicular traffic is not permitted on a newly grouted pavement for at least five days. Rail is hauled on the side of a differential dump car. This car has a hollow built-up bolster on each truck, which is larger than the standard tie. Two ties are cut to a 6-ft. length and inserted into these bolsters, projecting about 3 ft. from the side of the car. Five rail are laid upon these ties with a 5-ton electric crane and chained to the trucks.

Because of labor difficulty and expense, it has been our practice to use machinery wherever it was possible to finance its purchase. For instance, an excavator is used for trench work in city lines and ditching on the interurbans; a differential dump car is used for distributing rock ballast, hauling away dirt and delivering rail, sand and brick to the job; a 5-ton electric crane is used to unload rock ballast from steam equipment to stock piles or to our own work cars, also to handle special trackwork, and in some instances to excavate with clam shell; pneumatic machines tamp the track; resistance type electric welders weld the joints and cross bonds; wheel and reciprocating grinders are employed; tie-rod holes are either drilled with an electrically driven machine or cut with the oxyacetylene torch; electrically or gasoline driven concrete mixers place the paving base, grout bed and filler, and lastly, a conveyor is used to unload brick and cement from cars and to distribute brick from the side of the street to the track proper where the paving is being done.

As machinery is brought more into the practice of constructing and maintaining track, it is found necessary to vary the way organization to suit, and this variation tends toward high-grade foremen, more specialty men and fewer assistants, who used to be carried as "straw bosses" or "pushers." These latter are largely replaced by men of similar ability who have, however, made a specialty of one or two operations, such as welding and grinding, torch work and the like. It has also been essential in addition to training the head foreman to understand, and even manipulate various mechanical devices, to carry on the payroll a man of foreman's rank who is an excellent mechanic and whose duties are very largely confined to keeping the equipment in condition. Furthermore, the ordinary laborer cannot, so much as formerly, be left to his own devices, but must be to a certain extent trained in the new methods. All of this change in organization and equipment means increased overhead expense, so that in times of retrenchment it is a real problem to retain the backbone of the organization. The only solution of this formidable problem, and that only partial, is to instill such a spirit throughout the backbone aforesaid that it will cheerfully bend itself to any work, however menial, even to the use of the shovel. In other words, we expect head foremen to become laborers upon occasion, and by this better spirit and their greater intelligence and training to compensate the company for the difference existing between their salaries and the wages of common

American Association News

Be On Time

PRESIDENT GADSDEN announces that the convention meetings will run on schedule. This is absolutely necessary in order that the amount of work planned can be transacted. He says that the American Association meetings will convene promptly at 9:30, regardless of the number in attendance.

Reduced Rates for Convention

IF 350 certificates are filed with the special railroad agent at Atlantic City by those attending the convention a reduced rate amounting to a fare and a half for the round trip will be granted by practically all of the railroads in the United States. The plan has been approved by the Trunk Line Association and by the New England, the Central, and Western Passenger Associations.

A certificate stating that the purchaser is planning to attend the Atlantic City convention should be requested when the regular one-way ticket is purchased, and this certificate should be filed on arrival at Atlantic City at the registration booth of the association. If the necessary number of certificates are filed at Atlantic City they will be validated and will entitle each person holding a certificate to a return ticket by the same route over which he came at one-half of the regular one-way adult fare from the place of meeting to the point at which the certificate was issued.

Convention Specials

The "Chicago Special" for the Atlantic City Convention will leave at 10:30 a.m. central time, Sunday, Oct. 2, over the Pennsylvania Railroad, arriving at Atlantic City at 10:10 a.m. on Monday. It is expected that two or more special cars will be attached to the Manhattan Limited and it is possible that the delegation from Denver and other western states will join the Chicago crowd. Persons in the Chicago territory are invited to make their arrangements through H. J. Kenfield, of *Electric Traction.*

The "St. Louis Special" will leave St. Louis at 12:02 p.m., Saturday, Oct. 1, over the Pennsylvania Railroad, arriving at Atlantic City at 2:06 p.m., Sunday, after a change to special parlor cars at North Philadelphia. Those in the St. Louis territory should make their arrangements through B. W. Frauenthal, general traffic agent of the United Railways Company, St. Louis.

Nominating Committee Activities

The Nominating Committee, J. H. Pardee, chairman, will not present its report until Monday or Tuesday of convention week. The committee was instructed to report as early as feasible, but at no particular date. Invitations have been sent to the entire membership to make suggestions to this committee and these will still be welcomed up to the final meeting of the committee on Monday, Oct. 3, at Atlantic City. Suggestions should be addressed to the chairman in care of J. W. Welsh, secretary, at association headquarters, New York.

Engineering Association Reports Discussed

THE committee on standards of the Engineering Association met at association headquarters on Sept. 15 to pass upon all features of committee reports coming under the committee's jurisdiction. Reports from the following committees were presented for consideration: Buildings and structures, stores accounting, wood preservation, power distribution, power generation, way matters and equipment.

In the main the recommendations of the committees were approved as incorporated in the reports which have been printed and distributed to the members of the association. A few apparent discrepancies were referred back for correction, and several recommendations were referred for action to the convention.

An interesting feature of the meeting was the discussion on standards to be submitted to the American Engineering Standards Committee for indorsement.

During the discussion the way committee was complimented on the form in which its recommendations were framed.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Vote on Ouster

People of Detroit Will Be Permitted to Say If Railway Shall Be Dispossessed

When confronted with petitions for a referendum on the ouster of the Detroit United Railway tracks from Fort Street and Woodward Avenue, the City Council decided to submit the question to the voters at the November election. The ordinance passed by the Council ordering the tracks removed from the streets in question where franchises have expired, will be held in abeyance to allow the vote since enough signatures were attached to the petitions to prevent the ordinance from going into effect. A direct vote will be taken and it must be decided by a majority of the people as to whether they desire the tracks of the Detroit United Railway removed.

The Council could of course have repealed the Castator Ordinance. This measure ordered the company off the streets within ninety days and would have gone into effect if the petitions had not been circulated. It was passed by the Council and approved by the Mayor after the company had refused the Street Railway Commission's offer of $388,000 for the tracks.

One other point in the controversy between the company and the city was settled when the Council approved an agreement reached by the company and the city providing for the centering of the company's tracks on Grand River Avenue from Joy Road to the City Limits. The contract for paving Grand River Avenue at that point has been let and it is expected work will be started immediately. The company will meet the cost of centering the tracks in the street and will do the work under city supervision so that the line will be in accordance with municipal ownership standards. When the franchise expires on that section of the line the city, according to the agreement, will buy the tracks from the company for $127,827, less depreciation. The city recently started court action to compel the company to remove the tracks from the side to the center of the street. Proceedings were stopped when the agreement was reached.

Ten miles more of municipal ownership lines are to be started in operation soon, being the double track Clairmount-Owen cross-town line, which extends for 5 miles from Grand River Avenue on the west to Milwaukee Avenue. Track construction is practically completed and the overhead is being placed. This line will not connect up immediately with other municipal railway lines but will be linked up with the main municipal system by the day-to-day lines when they are taken over by the city.

No further action has been taken by the Street Railway Commission with regard to acquiring trackless trolleys or trollibusses as part of the city equipment and further trials of these buses will probably be made in the near future. An amendment to the city charter will be voted on which provides for giving the Street Railway Commission authority to buy buses or other forms of transportation equipment which are deemed advisable for purchase. The Council members in voting for the amendment supported the provision that the Council reserve the right to reject or confirm contracts for the trollibuses.

Large New Power Plant for Winnipeg Property

Arrangements have been completed for the financing of a $10,000,000 power development project at Great Falls on the Winnipeg (Can.) River. A. W. McLimont, vice-president of the Winnipeg Electric Railway, has recently returned from a trip east where he was in consultation with the firm of Nesbit, Thomson & Company, Montreal, who will finance the undertaking.

When completed the plant will have a capacity of 168,000 hp. Work has begun and about 200 men are now employed. This force will later be increased to between 1,500 and 2,500 men, and the whole plant is expected to be finished in 1927.

The undertaking will be carried out under the charter of the Manitoba Power Company, Ltd., which is taking over the assets of the Winnipeg River Power Company. Sir Augustus Nanton, Winnipeg, who is also a director of the Winnipeg Electric Railway, will be president and A. W. McLimont will be vice-president, of the Manitoba Power Company, Ltd.

Trackless Trolley Considered in St. Louis

A proposal is before the St. Louis Board of Public Service and the Municipal Bridge Commission for permission to operate trackless trolleys around a down-town loop in St. Louis, across the free bridge and to a loop in East St. Louis. It is thought that the one-way fare will be 5 cents.

George H. Tontrup, president of the National Safety Car & Equipment Company, is back of the scheme and it is his desire to put the system into operation as soon as the cars are built and the trolleys erected which, he says, will take less than two months.

Mr. Tontrup estimates the cost at $10,000 per mile and he proposes to install the system on a trial basis preliminary to a permanent franchise.

Progress Reported

Prospects for Settlement at New Orleans Assuming Concrete Form

The solution of the problems confronting the New Orleans Railway & Light Company, New Orleans, La., suggested in the report of Commissioner Maloney of the Public Utilities department would appear now to be dependent upon action taken in New York City. Telegrams received at New Orleans on Sept. 10 from those in touch with the situation there, where a conference of the security holders of the company was begun on Sept. 8, indicate that the prospect for a settlement is now assuming concrete form.

The report, as a whole, while not approved editorially by the local papers, is conceded by them to present a tangible means of putting an end to conditions which must inevitably produce further discomforts to the public and retard the industrial growth of the city.

One of those pleased with the outlook is R. S. Hecht, president of the Hibernia Bank & Trust Company and chairman of the committee of forty. In discussing the matter on Sept. 10 Mr. Hecht announced that he had received word from New York which indicated that the eastern bondholders favored the so-called Maloney plan of settlement.

In support of this opinion he issued the following statement:

> Based on the information before us we feel justified in saying, however, that the general disposition of the security holders appears to be to meet the city in the same spirit of compromise which the Council has shown toward the company. While there seems to be a good deal of disappointment among them that the rate of return was not made 8 per cent, we are inclined to believe that both the valuation and the rate of return fixed in the city's proposal will be accepted.
>
> Everybody seems to be ready to admit now that the future operations of the company will be absolutely subject to the control of the Council through its regulatory powers, but there are some minor details which will no doubt require a thorough discussion between the Council and the representatives of the security holders before the matter can be finally settled.
>
> The security holders emphasize that they are exceedingly anxious to get the matter settled at the earliest possible moment, and they expect their representatives to be able to reach New Orleans within a week to bring their formal answer and their suggestions as to the best method of working out a reorganization plan which will be permanent and will make the future financing as inexpensive as possible. We feel very much encouraged over the outlook and believe that a satisfactory agreement will be reached.

Assistant Attorney General Luther Hall addressed a communication to the Commission Council on Sept. 7 warning that body that it is without authority to negotiate with the railway on any basis that will carry a higher fare than 5 cents, as provided in the franchise.

Des Moines Muddling Along

Disgust Is Increasing With Present Make-Shift Bus Transportation—Proposal from Mr. Fay

T. J. Fay, president of the Fay Motor Bus Company, Rockford, Ill., made a definite proposition to the City Council of Des Moines, Ia., on Sept. 16 for taking over the transportation problems of the city under a two-year franchise. Mr. Fay's proposal received no immediate attention from the Council. It was simply "received and filed." His offer provides for a 5-cent fare with universal transfers and eight tickets for a quarter for school children. Mr. Fay advised the Council that he could show ample financial backing and that if the franchise was granted to him he would guarantee to have 100 buses in operation within sixty days and sixty more in an additional thirty days.

According to Mr. Fay studies that he has made would tend to show that 160 buses are ample to handle the situation in Des Moines. This figure is based upon an average seating capacity of twenty with ten additional capacity without discomfort. According to Mr. Fay these figures were secured after his company has carried 10,000,000 passengers under conditions not widely different from those which prevail in Des Moines.

FAY OUTLINES HIS PLAN

The Fay proposal provides for the city being reimbursed for wear and tear on pavements by the payment of $25,000 a year by the bus company. City Councilmen expressed themselves as feeling that this figure is ridiculously low, considering the damage that has already been done to the paving in Des Moines by the buses.

Attorneys for the present bus operators have expressed themselves as being opposed to any amalgamation with the Fay interests. They contend that they made the first proposition to the Council and that they are entitled to the first consideration if a bus franchise is awarded by the Council.

The City Council took its first definite stand in the regulation of buses during the week ended Sept. 17 when it ordered buses placed on three lines now without service, and also demanded that two additional buses be placed on the Southwest Ninth Street line.

The proprietor of a truck sales company which has been supplying buses to some of the local operators made a statement in a daily newspaper last week that the buses could not operate successfully at a 5-cent fare and called attention to the fact that one of the customers of the company had pulled off three buses because they were not paying.

Ten additional buses arrived in Des Moines on Sept. 14, having been driven the entire distance from Connecticut. They were apportioned to various existing lines in the city.

There is every reason to believe that sentiment is steadily growing in favor of the railway as the people tire of the discomforts of the present makeshift bus transportation.

Corporation Counsel Miller made his preliminary report to the City Council on Sept. 19 upon certain features of the franchise submitted by the Harris interests in behalf of the Des Moines City Railway. It was expected that Judge Miller's final report would go to the Council on Sept. 23 or 24. The report submitted constituted only certain changes which Mr. Miller would recommend that the Council make before submitting the franchise to the city for a vote. Among the changes suggested by Judge Miller are the following:

> Complete change of labor arbitration clause and the substitution for three district judges provided in the original franchise members of the State Railway Commission acting as individuals.
>
> City car supervisor to be a graduate engineer of at least ten years' experience in electric railway operation to be elected by the City Council and responsible to it alone, although to be paid by the city. Under existing franchise supervisor is paid by the company.
>
> Definite sliding scale of fares to be contracted by the railway before franchise is submitted. Franchise should provide for satisfactory service and necessary repairs before payment of any dividends on common stock.
>
> Clause suggested by which company will agree to handle disputes with employees by arbitration.
>
> Question of extension should be arbitrable and company should not have the right to veto. Use of one-man cars recommended where practicable.

The bus owners made what is considered a good political move when on Sept. 21 they started service on Center Street, which formerly had no service. The line is in one of the best residential sections of the city located at a considerable distance from two existing car lines.

Saginaw Knows the Bus Won't Do

This is the seventh week that Saginaw and Bay City have been without electric railway service and nothing definite has been done to provide Saginaw with a form of transportation on which to build for the future. Even the friends of the buses are frank to admit they will not do and if the cities are not to have electric railway cars some other means must be provided to take care of the people. It is now well known that the jitneys, numbering about sixty-five and owned and operated by individuals, cannot be properly regulated. Many drivers do not appear on the streets until 6:30 or 7 o'clock and a majority are running on a go-as-you-please schedule. When business is quiet, they lay off, and only work during rush hours.

Members of the Council will attend the demonstration of the trackless trolley which will be given in Detroit the early part of next week, and it is expected that a representative of the Imperial Omnibus Company, New York, will come to Saginaw right afterward to survey the city's requirements and present a proposition to the people through the Council.

Members of the Council have been considering a regulatory ordinance regarding jitneys for several weeks past, but apparently are as far off from adopting it as when they first considered it. The matter of the owners furnishing a suitable indemnity bond has been the bone of contention. Every member of the Council has gone on record as favoring a large bond, but when the jitney men threatened to appeal to the people the Councilmen backed down and are about ready to agree on a $5,000 policy for one accident. They do not want to have the jitney men go through with their threat, and they are afraid if they fix the maximum at $5,000 the people will object. So in the meantime passengers ride at their own risk.

Otto Schupp, receiver for the railway, says the company is still working on the inventory and until it is completed and filed with the referee in bankruptcy he knows of no new developments.

Little Damage to San Antonio Utilities

Damage to the property of the San Antonio (Tex.) Public Service Company as a result of the flood on Saturday, Sept. 10, was slight. At the New York office of the American Light & Traction Company, which controls the electric light and power, street railway and gas utilities in San Antonio, it was stated that there was little or no physical damage to any of the company's property. Only one of the company's plants, a comparatively small one, known as Station B, was reached by flood water, and it was not believed that the total cost of clearing away débris and making necessary repairs would exceed $15,000 or $20 000. Electric service was interrupted shortly after the flood started, but was restored 8 o'clock in the evening of the same day. Traction service was resumed on Sunday morning. The gas service was affected the least.

Mr. Mitten Wants His Status Re-established

Thomas E. Mitten, chairman of the executive committee of the Philadelphia (Pa.) Rapid Transit Company, on Sept. 19 addressed the executive committee of the board of directors as follows:

> General supervision of P. R. T.'s rehabilitation and its operating organization has now been continuously under my direction for more than ten years; the extent of my obligation and compensation being established under an arrangement made with E. T. Stotesbury and approved by the board of directors.
>
> The scope of my duties and responsibilities, during this period, has been so changed and enlarged as to make a review of the whole matter desirable.
>
> With this in mind, I would request that the present agreement be considered as expiring March 31, 1922.

In commenting on Mr. Mitten's letter the Philadelphia *Ledger* says that it is generally believed that Mr. Mitten desires to step out of active charge of the company's affairs and place the details of running the road into the hands of a group of executives whom he has trained in the electric railway business and who are now identified with the Philadelphia Rapid Transit Company or allied lines.

Amalgamated Seeking to Save Albany Situation

In spite of the fact that the Amalgamated Association in convention in Georgia passed a resolution endorsing the 1,400 Albany and Troy strikers who "are on the firing line," and voted to assess each of the 132,000 members 50 cents with authority for a further assessment if required to keep up the struggle until an honorable settlement or adjustment can be reached between the company and its former employees, it is evident that the strike has been won by the United Traction Company.

On the Sunday before Labor Day, President Droogan of the Albany local came out in an open letter indorsing the independent candidacy of Patrick E. McCabe for Mayor of Albany, he being the only candidate who has made an issue of the strike and the only man seeking office who has espoused the cause of the laboring man. Mr. Droogan in a very stormy sessions of the Albany local was bitterly assailed for having dragged the union into politics, but he asserted he did it merely as a private citizen and not as the union head. Mr. Droogan attended the convention at Atlanta, but it is understood, he is to be asked to step down and out of the leadership on his return.

Should he do so much of the cause of difference between the United Traction Company and its former employees will have been eliminated, as the fight of the company to break the union was to a very considerable extent an effort to break Droogan, whose tactics of abuse of the company have for years been a source of rancor.

The immediate result of Mr. Droogan's letter espousing the candidacy of Mr. McCabe was the driving onto the cars of some 5,000 to 10,000 members of other unions who had refrained from riding all during the period of the strike. This was best evidenced that same day at the ball grounds, where the Sunday before only about a dozen passengers had been carried. The day Mr. Droogan's political statement appeared, fully 2,500 boarded the cars. While the strike is all over but the shouting, the remote possibility still exists that some eleventh-hour agreement may be patched up between now and the eve of election in order to gain votes.

Practically all of the former employees of the railway are working at occupations which from a salary standpoint are about as lucrative as their former jobs, according to reports.

Watchful Waiting in Connecticut

President Lucius S. Storrs of the Connecticut Company stated upon his return from California last week that there would be no fare decrease at present to meet the competition of the new motor bus business.

The trustees of the company held their regular meeting Sept. 3 but did not take up the fare question. Mr. Storrs pointed out that while the railway company was paying its way it has many obligations to meet and a fare decrease will have to wait for some time. A decrease will be granted, however, just as soon as conditions permit.

Mr. Storrs stated that he did not have knowledge of the full plans of the promoters of the Advertisers' Special Coach service but if the service is a jitney service proper steps will be taken to prevent any violation of existing laws.

Samuel Silvergilt, secretary of the motor bus interests, called a meeting of all drivers at 1 p.m., Sept. 8, in New Haven to outline plans and give out supplies for initiating the service on four local cross-town lines.

Orders Being Placed for Material for Running Change

Orders for new cross-overs and special work are being placed by the British Columbia Electric Railway, Vancouver, B. C., in connection with the changing of the rule of the road from left to right at the end of the present year. There are on the mainland system of the company thirty-three cross-overs which must be removed and replaced. Some of them may be taken up and no new cross-overs installed as the necessity has gone.

In New Westminster, new special work will be necessary at the interurban station. None of this will be installed before the change is made, but the intention is that cross-overs will be blocked up temporarily until the gangs can reach them. Electric switches, of which there are fifteen on the mainland, will be hand operated until the work of transferring them to the opposite tracks can be completed. Some work will also be necessary in readjusting the trolley wire alignment at curves.

The actual date of making the change has not been decided. It was proposed to make it on or about Jan. 1, 1922, but the possibility of snow at any time during the winter makes the change hazardous. The company has placed orders for new castings for two of its snow sweepers, leaving the others for left-hand operation in case snow should come before the change is made.

Trainmen Reduced Twelve Cents an Hour

By a recent decision of the arbitration board selected under the agreement of April 28, 1921, between the officials of the Auburn & Syracuse Electric Railroad, Auburn, N. Y., and the Amalgamated employees, wages prevailing for the year ended April 30, 1921, were reduced as follows:

	Cents per hour	
	Old	New
City trainmen	60	48
Interurban trainmen	62	48
Freight and express trainmen	65	50⅓

In the case of all other employees the decrease in the cost of living was applied to the rate in effect for the year ended April 30. The results arrived at were obtained on the basis of the reduction in cost of living in Auburn, which was found to be and agreed upon as 22.6 per cent.

The board consisted of Henry J. Barrette, president of the local division of the Amalgamated Association, who represented the men; Lawrence E. Lippitt, auditor-treasurer of the Auburn & Syracuse Electric Railroad, who represented the company, and Richard C. S. Drumond, former city attorney, who acted as the chairman of the board which passed upon the matter.

News Notes

Franchise Vote in October.—The date for the referendum election in Houston, Tex., on the new street railway franchise drawn in favor of the Houston Electric Company has been changed to Oct. 4. The City Council had previously set Sept. 27.

May Request Arbitration.—It is expected that employees of the Hull (Que.) Electric Railway will soon request an arbitration board for a settlement of negotiations over a 7-cent an hour reduction in wages proposed by the management. The new wage scale which would mean about a 20 per cent cut would bring the pay back to the 1920 level. Negotiations have been going on in a quiet way with the expectation that the men would accept the reduction.

Michigan Towns Test Rate Law—Avon township, which is in Oakland County, and the city of Pontiac have advised the Detroit United Railway that an appeal to the United States Supreme Court is being made against the decision of the Michigan Supreme Court, which in June sustained the D. U. R. in a case which had been started by Avon township and upheld the validity of the Smith rate law. Under the Smith rate law franchises between communities and electric railroads could be set aside and new rates fixed by the Michigan State Public Utility Commission. It is not expected that the case will come up for a hearing as to its final disposition before early next year.

Decides in Favor of Railway.—The judges of the State Supreme Court on appeal refused to grant an injunction upon petition of A. M. Scott and others against the Charleston (W. Va.) Interurban Railroad involving the use of Ruffner Avenue for railway purposes. This action of the Supreme Court removes the last obstacle to the new system of operating cars on Capitol Street and the east end. The proposal of the railway was fought from the beginning by residents of Ruffner Avenue and others. It is understood the new system, which will be started when a railway is built on Ruffner Avenue, will furnish three-minute service. Capitol Street would be made a one-way street for traction cars as well as Washington and Virginia Streets.

Financial and Corporate

$40,000,000 Fair Purchase Price

Engineer for City of San Francisco Fixes This Sum as Amount Municipality Should Pay for Market Street Railway

M. M. O'Shaughnessy, city engineer of San Francisco, Cal., has submitted to the Mayor and Board of Supervisors a valuation of the properties of the Market Street Railway in which he recommends $40,000,000 as the fair price which the city should pay for the property. He refers to the wide variation in values under previous valuations of the property and says that in his judgment it is conservative to state that the reproduction cost new less depreciation as of today cannot be less than $35,000,000.

THE report was made at the request of the Board of Supervisors and is believed to be preliminary to the adoption of an ordinance by the board calling for a referendum on the purchase of the properties. This, if done, would be under Charter Amendment No. 30, enabling the city to acquire public utility properties and pay for same out of earnings.

VOTE IN NOVEMBER UNLIKELY

When various civic organizations urged the submission of the purchase plan to the voters and an appropriation of $15,000 for a survey was made in the budget, it was expected that the question would come up at the municipal election next November. Officials doubt now whether this can be done, and say there is hardly time in which to pass the necessary ordinances even if the city and the corporation can come to an agreement upon the price.

Reports on valuation of the property had previously been made by the company's engineers and the California Railroad Commission. That of the latter, made in approving the reorganization plan which became operative last April, was $41,424,961, representing physical value only. The company's engineers, on the same basis, arrived at a valuation of $51,856,218.

In discussing the valuation of the Railroad Commission Mr. O'Shaughnessy states that the commission's valuation was consistent at the time it was made, the value being based on values in 1918, 1919 and 1920. The valuation arrived at by the city's engineer, however, covered a five-year period, from 1913 to 1917, this period having been selected as basic for the valuation which was based on labor and material costs in that period.

MR. O'SHAUGHNESSY HOPEFUL

The Market Street Railway was finally reorganized in April of this year from the old United Railroads of San Francisco. The new company has a total capitalization of $47,973,000 as compared with $82,411,600 par value of capitalization of the former company.

Mr. O'Shaughnessy estimates that the following economies will be obtained by municipal ownership:

Yearly saving in taxes..........	$551,000
Damages in operation reduced by automobile and jitney regulation	50,000
Adjustment of Market St. Ry. power contract	350,000
Adjustment of car schedules with non-competitive conditions	500,000
Combination of work in shops, etc.	70,000
Elimination of presidents and directors, and legal expense.....	275,000
Increase in receipts from elimination of competitive jitney operation	500,000
	$2,296,000

The Municipal Railway is now paying a greater wage to its employees than the private company and Mr. O'Shaughnessy has made a careful computation of the annual increase of wages to be incurred by placing those men on the municipal scale. On this point he says:

> This added expense would amount to $1,715,000. By deducting this from the savings of unified operation an annual increase of $575,000 in net earnings can be made. This amount with the net income from operation would at present more than meet interest at 5 per cent on the $40,000,000 valuation which I place on the property. If the unified holding is conducted as economically and safely as the municipal railway has heretofore been operated, there is no doubt that the proposed purchase will be an advantage to the city.

HIGH IDEALS NECESSARY

Many other changes suggest themselves to the city's engineer. Of some of them he says:

> Universal transfers could be adopted which would promote more car riding and increase revenues, and besides be a great convenience to the public in saving time in making trips from different portions of the city now served by the two lines. Conditions on Market Street could be improved by restricting rapid transit to the center tracks, with a longer distance between stops and confining the service to cars for the outside districts; the outer tracks on Market Street would be used for local shorter hauls and frequent stops would be made with greater safety and convenience to the public. Economies could be effected by discontinuing unnecessary car lines, as many of these now operated by the company are due to franchise requirements; new extensions of track could be made into districts now without service due to dual ownership which has heretofore restricted extensions; the jitneys should be absolutely forbidden to travel on streets now served by cars, as it is an economic waste to have a dual service for the same object.

Success of the unified ownership, says Mr. O'Shaughnessy, would, however, depend on conducting the system on the same high ideals and good business principles which have controlled the operation of the present Municipal Railway in the past nine years.

Toronto Arbitration Started

Present Value of $20,447,612 Placed on Road by Expert for Railway—Three Arbitrators Sitting

The board of arbitration which is to determine the amount that the city of Toronto, Ont., is to pay for the plant and properties of the Toronto Railway, taken over by the city upon the expiration of the franchise on Sept. 1 last, commenced taking evidence on Sept. 13.

The board of arbitration consists of Major Hume Cronyn, London, chairman; Sir Adam Beck representing the city of Toronto and Sir Thomas White representing the Toronto Railway. The fees of the members of the board of arbitration have been fixed not to exceed $250 per day.

COMPANY HEARD FIRST

In opening N. W. Rowell, of counsel for the company, stated that a completed inventory of the properties and plant had been made. The railway was of the overhead trolley type, consisting of 139.03 miles of railway converted into single track, of which 129.58 were on public streets and 9.44 miles in carhouses. There were 152 special track intersections, 709 motor cars, made up of 475 double-truck cars, 253 single-truck and 251 P. A. Y. E. cars; there were also 121 trailers, 5 sprinklers, 19 sweepers and 26 repair and miscellaneous cars.

With respect to traffic 21,816,551 car miles were run in 1920; 307 cars were operated in minimum hours and 797 during maximum periods, while 197,346,726 passengers were carried and 77,911,713 transfers issued.

It was decided to limit the number of witnesses, including experts, to twenty-four for each side.

W. J. Hagenah, Chicago, specialist in the investigation of public utilities and formerly of the Wisconsin Railroad Commission, was the first witness for the company. He stated that he was given absolute charge to value the properties of the railway, employing in doing so, a staff of fifteen to twenty and going as high as forty. He stated that 19 miles should be taken up and replaced at once; 12 miles was in generally fair condition; 14 miles in better than 50 per cent condition and 45 miles in excellent condition.

AVERAGE PRICES USED

The valuation was made on the basis of the average value of labor and material for the three years up to August, 1921, because it would take three years to build the system. Mr. Hagenah set down the present value of the entire system at $20,447.612, while the replacement value was considered at $27,161,649.

A full account of the taking over of the railway system by the Toronto Transportation Commission on behalf of the city corporation was published in the ELECTRIC RAILWAY JOURNAL for Sept. 10.

Boston's Industrial Slump Hit Elevated Hard

The revenue of the Boston (Mass.) Elevated Railway for July was $192,089 less than the same month last year. Expenses for the month exceeded receipts by $142,486. On July 1 there was a surplus of $131,985, which has since been changed to a deficit of $10,501.

In a statement dated Sept. 6 Edward Dana, general manager of the company, said that this was the result of country-wide conditions affecting the company's gross business as indicated by the decrease in revenue passengers in other large cities this year as compared with last year. The figures used by Mr. Dana follow:

	July, 1921	July, 1920
Interborough Rapid Transit	73,799,633	75,789,538
Philadelphia	54,031,261	63,089,650
Boston	25,279,587	26,640,614
Detroit	23,181,841	32,136,658
St. Louis	23,162,769	24,534,799
Cleveland	23,029,791	27,978,414
Pittsburgh	21,168,000	23,478,000
Baltimore	20,233,905	22,369,206
Minneapolis	18,207,344	19,882,822
Chicago Elevated	13,802,153	17,024,667
Cincinnati	8,632,780	10,175,578
Toledo	4,118,848	4,568,013

The accompanying table indicates the revenue and the division of expenses during the last four years.

REVENUE OF BOSTON ELEVATED RAILWAY

	Third Trustee Year Ended June 30, 1921	Second Trustee Year Ended June 30, 1920	First Trustee Year Ended June 30, 1919	Year Ended June 30, 1918
Revenue from fares	$33,122,199	$31,899,320	$24,472,429	$18,781,370
Revenue passengers	337,381,994	324,192,374	331,348,124	376,466,229
Rate of fare	10 cents	10 cents	5, 7, and 8 cents	5 cents

COMPARATIVE DIVISION OF EXPENSES

Wages	$16,753,667	$16,381,206	$13,554,684	$9,147,757
Materials and supplies	2,899,983	3,321,672	4,096,538	2,680,424
Injuries and damages	627,629	627,626	805,353	817,227
Depreciation	2,004,000	2,004,000	2,004,000	352,670
Fuel	2,399,277	1,996,717	1,901,597	1,381,957
Taxes	1,306,736	1,075,497	941,612	905,033
Rent of leased lines	2,673,166	2,607,565	2,587,129	2,547,421
Subway and tunnel rentals	1,947,963	1,591,324	1,491,999	991,551
Interest on borrowed money	1,483,625	1,593,258	1,423,142	1,238,374
Miscellaneous items	54,479	69,285	37,373	16,050
Dividends	1,523,367	1,403,970	1,360,220	None
Profit or	550,253	17,080	....	....
Loss	....	....	4,980,152	598,442
		Back pay	435,348	
			5,415,500	

Court Fixes Status of Claims Against Road Sold Under Foreclosure

The status of the various claims against the Springfield Railway, Terminal Power Company, Springfield, Ohio., and arrangements for completing the transfer of that concern to the bondholders, who have bid it in, are ruled upon by Judge Slater in the United States District Court at Cincinnati (Ohio).

To complete their purchase it is directed that the bondholders, in addition to the $25,000 which they already have paid and the $245,500 of the company's bonds which are to be applied as part of the purchase price, must also pay the further sum of $84,390, in installments of $28,126, in thirty, sixty and ninety days. The bid of W. P. Sturtevant, New York, for the bondholders' committee was $300,000.

The total bonded indebtedness was $250,000 and the bonds are to be accepted at 60 per cent of the face value on the purchase price. The court's costs, taxes, pay of Receiver George Whysall and the trustees of the road in the two years it has been in the hands of the receiver amount to approximately $17,500. These are declared to be entitled to priority over other claims. Other claims having preference as to their order made a total of $97,261.

Receiver Whysall has on hand cash and quick assets of the company to the amount of $12,880. The order of the court has been concurred in by all parties interested in the disposition of the road.

St. Joseph Valuation Case Not Carried Up

Events which followed the granting of the injunction of Judge Van Valkenburgh in the federal court at Kansas City, Mo., last fall, restraining the Public Service Commission from enforcing its order fixing fares on the railway lines of the St. Joseph Railway, Light, Heat & Power Company, led the commission not to perfect its appeal in the case. For one thing the company returned to the commission, and it became necessary to grant a rate higher than the one which formed the basis of the suit. That development, in connection with other considerations, led the commission to conclude that it would not appeal from the court decision.

The grounds of the court's opinion restraining the commission from enforcing its original fare order were the wrong methods used by the commission in valuation—specifically, the use of original cost figures, and standards of prices of a past period and of a pre-war period. At the time of the court decision, which was reviewed at length in the ELECTRIC RAILWAY JOURNAL for Nov. 27, 1920, page 1122, members of the commission were quoted as saying that if the opinion was allowed to stand the whole system of rate making of the commission, affecting many utilities, would have to be made over.

In deciding the St. Joseph case the court went at length into a discussion of the "present fair value" as the correct basis for rate making and concluded that since present fair value was not sought by the commission its resulting computation necessarily reduced the total valuation so substantially as to make the rate based thereon inadequate and practically confiscatory. It is understood that in considering the second appeal of the company for relief the commission did allow due weight to some of the considerations in rate making outlined by the court in its original restraining order.

New Company at Toledo

Light and Power Interests in $25,000,000 Corporation Which Meets Mr. Doherty's Promises

The Toledo (Ohio) Edison Company, has been incorporated to take over the lighting and power business of the Toledo Railways & Light Company, the railway lines of which are included in the Community Traction Company, formed some time ago to take over the city railway lines at Toledo.

The new corporation is capitalized at $25,000,000. It will include the Acme Power Company, the Toledo Railways & Light Company, the Toledo Gas, Light & Heating Company, and several of the smaller Doherty subsidiaries at Toledo.

The Toledo & Western Railroad, the Maumee Valley Railway & Light Company, the Adrian Street Railway and other traction interests will be kept as separate companies.

The Public Utilities Commission has authorized the new company to issue $4,000,000 of preferred stock as provision for the permanent financing of its business in Toledo. Of this issue $2,500,000 will be first preferred 8 per cent cumulative stock and $1,500,000 will be 7 per cent cumulative preferred stock.

The commission has also authorized the company to issue $13,500,000 of first mortgage 7 per cent bonds. The proceeds of this issue will be used to refund the $12,000,000 issue of Toledo Traction, Light & Power bonds which are due in 1922. A portion of this issue will be used to remove the encumbrance from the railway property turned over to the Community Traction Company, last February.

Henry L. Doherty and the Cities Service Company guaranteed to the city of Toledo that the property now included in the system of the Community Traction Company would be freed of debt and liens before December of this year.

It is planned to unite the development of all the lighting, power, heating and artificial gas production under the new company and provide the means for extending service as the city grows.

Frank R. Coates, president of the Toledo Railways & Light Company, has sent out the call for a stockholders' meeting to be held Oct. 10 to approve of the change in name and the new financing of the company.

Traffic and Transportation

1,500,000 Fewer Passengers

Traffic Falling Off in Cincinnati Despite Recent Reduction in Fares

Despite the recent reduction in fares on the lines of the Cincinnati (Ohio) Traction Company, a preliminary report of the number of riders for the month of August shows a decrease of approximately 1,500,000 revenue passengers as compared with the same period last year. Figures as to the actual receipts and the exact amount of the deficit based upon the number of passengers will be ready within a short time.

Officers of the traction company, as well as William J. Kuertz, director of street railroads, appear to be sanguine that whatever deficit may have been incurred by reason of the falling off of passengers during August will be made up in September.

SATURDAY TRAVEL VERY LIGHT

The loss of revenue passengers during last month is attributed to the fact that large department stores were closed one-half day Saturdays during the summer months and also to the fact that factories shut down on Friday nights for the week-ends instead of reopening their plants for a half-day Saturdays. Records indicate the number of revenue passengers on Saturdays has been especially light.

The situation is being viewed with keen interest by the city officials, since it will have a decided bearing upon the fare in November, on the first day of which a further reduction in fares to 7½ cents is scheduled under the ordinance passed two months ago by the City Council, modifying the terms of the service-at-cost franchise under which the company is operating.

A reduction in fares to 8 cents was made possible only on Aug. 1, because the ordinance modifying the franchise provided that the payment of the annual franchise tax, to be paid by the company when earned for the current year and also for last year, was to be deferred until April 1, 1922. Furthermore this tax was not to be calculated as a deficit for rate-making purposes. This fact, together with a saving of several hundred thousand dollars by the company in the reduction of the wages of platform men, created a surplus sufficient for use to predicate a reduction in fares.

PRESENT RATE MAY CONTINUE

The modification ordinance provides in substance that unless the reductions are made on Aug. 1 and Nov. 1 the terms of the original service-at-cost franchise again become operative. In view of this situation, unless the receipts of the company during September are sufficient to take care of operating costs and also provide a surplus to wipe out the deficit for August, it is not improbable that the rate of fare will remain as it is, if it is not increased.

Commission Side Heard in New Jersey Case

L. Edward Herrmann, counsel for the Board of Public Utilities Commissioners of New Jersey, made a preliminary statement to the special statutory court consisting of Federal Judges Woolley, Rellstab and Davis on Sept. 14 before he started his argument against the Public Service Railway's appeal for an injunction which would prevent interference with the collection of a 10-cent fare.

Mr. Herrmann said:

> No increased fare is going to give relief. Much falling off in profits follows each increase, and much of it is brought about by similar vilifications. You have heard described the terrible nightmare of bankruptcy and disaster.
>
> There have been no deficits as claimed by the company. They (the Public Service) ingeniously tried to include in operating expenses interest on leases, rentals and also guaranteed dividends. Ratepayers can not be mulcted to pay these extravagant rentals or charges.
>
> A man can't be compelled to pay excessive rents for a house just because the owner has mortgaged it for twice as much as the property is worth. If the company goes into bankruptcy it will be through its own misdeeds. All it is entitled to is a fair return on a fair value. The Utilities Board is obligated only to see that it gets this fair return. The company can appropriate it to any channel it sees fit. This issue is not before the court.

The court announced at the outset of the hearing that no decision had been reached on the appeal of the municipalities for admission as defendants. The cities claim that a 10-cent fare will be confiscatory of the rights of the people.

The commission was not entirely successful in the other issue it raised before the court at the forenoon session, that of the introduction of the 13,000 pages of testimony taken in the rate cases before the board as evidence in this proceeding. An hour's deliberation by the three judges ended in the conclusion that only such parts of the record as were pertinent would be admitted.

Inquiry Planned Into Buffalo Fare Charges

Upon the recommendation of Public Affairs Commissioner Frank C. Perkins, the Socialist member of the Buffalo City Council, the Council adopted resolutions authorizing Corporation Counsel William S. Rann to examine the books of the International Railway to determine whether the city should ask the Public Service Commission to restore the 5-cent fare. The International now charges a 7-cent fare within the city, with four tokens for 25 cents.

Commissioner Perkins told the Council that the total operating revenue of the International Railway for the first six months of the year is greater than the operating revenue of the company for the corresponding period of last year. Wages have been reduced by the company and Commissioner Perkins declared that from $2,000,000 to $3,000,000 is now being used out of earnings to rehabilitate the system, which has been neglected since the early days of the war.

Youngstown Adopts Pass

Unlimited Weekly Rides for $1.25 as a Stimulant to Increase Business—Present Fare Nine Cents

Under the terms of an ordinance passed on Sept. 19 by the City Council of Youngstown, Ohio, supplementary to the service-at-cost ordinance under which the city street railway service is furnished, the way has been cleared for The Youngstown Municipal Railway, a subsidiary of The Pennsylvania-Ohio Electric Company, to make an eight-week trial use of the "weekly pass." If the plan proves successful in that period it will be continued as a regular feature.

The date on which the use of the "weekly pass" will start has not been definitely decided, but it is planned by the company to begin the use of the pass on Monday, Oct. 3. The ordinance was passed unanimously by City Council, both city authorities and company officials being of the opinion that the innovation will act as a stimulant to traffic in the city.

The plan for the use of the pass in Youngstown is similar to that in vogue in Racine, Wis., and other cities. The pass will sell for $1.25 and will be good for an unlimited number of rides for the bearer within the period of a week, from Sunday midnight till midnight of the following Sunday. The passes will be good for any ride within the city fare limits at any time during the day or night, on exactly the same basis as a cash fare or the city tickets which are sold in strips of six. No transfers will, however, be issued to bearers of the passes, who, of course, will use their unlimited passes for any continuance of their rides.

The passes will be used as supplementary to the present rates of fare, which are 9 cents cash, six tickets for 50 cents and 1 cent additional for a transfer. The passes will be sold at the ticket offices of the company and on the cars by conductors and operators and will be placed on sale each week two or three days before the day on which their use will begin, so as to distribute the sale of the tickets over several days.

Street car riders and the public in general will be acquainted with the use and advantages of the "weekly pass" through newspaper advertising and street car window posters prior to and following the introduction of the use of this form of ticket.

Ten-Cent Fare Denied in Utica

Case There of Unusual Interest Because of Comment by Commission —First Important Fare Decision by New Body

Permission has been denied by the State Public Service Commission to the New York State Railways Company to increase fares in Utica from 6 cents to 10 cents. The opinion was prepared by Chairman William A. Prendergast. It was unanimously adopted by the entire commission and emphatically outlines the policy of the commission in similar cases. The ruling covers the first fare increase case of any importance to be decided by the new commission.

A STATEMENT of particular significance in the commission's opinion is as follows:

> Public utilities just as other departments of business must expect to cope with periods of depression and short earnings, just as at other times they enjoy periods of prosperity and full dividends. If the public is expected to make up every deficiency in order to give a utility a good round rate of earning power, then the public is entitled to the benefit of the surplus over the agreed earning rate in times of prosperity.

On Dec. 22, 1920, the company applied for permission to set up a new rate of at least 10 cents per passenger in the territory known as the Utica zone, described as "the lines operating in the city of Utica and between Utica and the villages of Whitesboro, New York Mills, New Hartford and Clinton." Approximately 60 miles of trackage are affected by this petition. Operation in this zone is conducted under a franchise from the city of Utica and other local authorities, on the basis of a fare per passenger of 5 cents. In 1918 in consideration of acute cost conditions due to the war, permission was granted by the local authorities to charge a fare of 6 cents, which has since been in effect.

On the opening of the fare proceedings before the commission the city entered an objection to the jurisdiction of the commission, on the ground of existing franchise relations between the city and the company. This objection was overruled by the presiding commissioner, Judge Kellogg. Subsequently the city sought court intervention to prevent action by the commission, but was unsuccessful. The hearing upon the petition then proceeded.

In support of its claim to a larger return the company submitted three distinct appraisals. These it described in its brief as follows:

An appraisal based on the trend and average prices of the years 1912, 1914 and 1916 known as the (1) pre-war valuation. (2) An appraisal based on average prices from the years 1915 to 1919 inclusive. (3) An appraisal reflecting 1920 prices, known as the reproduction cost new or present-day valuation.

The commission points out that the company's proof was therefore confined to a single element of "fair value," namely, cost of reproduction, new, on the basis of (1) prices prevailing before the war, (2) prices in 1915-1919 and (3) prices in 1920. The results of the three valuations were as follows:

	Field Costs	Total Cost New
Pre-war prices	$3,977,700	$6,168,456
1915-1919 average	5,786,567	8,898,312
January 1, 1921	7,801,837	11,940,796

In commenting on these figures the commission says:

> In setting up these appraisals the company's expert, Mr. Campion, has apparently sought to establish a wholly theoretical estimate of value. The element of original cost seems to have been largely discarded. In addition to this the place of a depreciation account in the calculation of "fair value" has been entirely ignored. It is not going too far to say the company appears to have rested its case upon the foregoing claimed reproduction values. It cannot be presumed that the commission is confined to any one such type of valuation. The judgment of courts up to this time clearly states it is not. In addition, business experience and common justice to the public demand that it should not be. To reiterate an argument which has been used very frequently of late by regulatory bodies it would be grossly unfair to the public to use the extraordinary dislocation in prices due to a world war as the groundwork for the fixation of a proper rate base.
>
> The courts have repeatedly ruled that the estimated cost of reproduction is merely one method of reaching just decisions. It cannot be used without reason and its use in a period when prices have been subject to such violent fluctuations as have characterized the past five years would leave little of fairness in the term "fair value," which means essentially the just amount on which a public utility company is entitled to earn a return.

The commission regards the city's evidence on the question of the value of the property employed by the company to be of a much more definite character. On this point it says:

> In its computation the city has used the actual figures given by the company in years past in its sworn tax reports, figures used by it in reports filed with the Public Service Commission, and in addition has as to certain periods taken the exact cost figures as they appear upon the company's books. For these reasons the city's valuations are based upon determinable quantities. Through its experts it has submitted evidence of the actual cost of the railway property used in rendering service in the Utica district and proved that the normal reproduction cost (pre-war) would not exceed the actual cost. So far as the tangible property is concerned, there is no considerable difference between the city's figures and the company's pre-war field cost figures; but the company fails to make any deduction for depreciation or exhaustion of capacity for service of physical property, and it makes larger additions for intangible values, thus:

	City	Company
Road and equipment—cost	$3,500.472	3,695,077
Accrued depreciation	1,335,721	none
Present value	$2,164,751	$3,695,077
Materials and supplies	125,000	282,623
Cash—working capital	....	51,855
Interests during construction	80,000	546,303
Taxes during construction	10,000	82,134
Organization and development	40,000	....
Total	*$2,429,751	**$6,168,456

* Includes $10,000 added for bridge at final hearing.
** The total includes $121,779 for preliminary expenses, $254,942 for cost of financing and numerous other items, including $764,825 going concern value.

> The large "overheads" in the company's valuation are based on the theory that the property is to be constructed as a whole, whereas the city's overheads are based largely on the company's records, which show that the necessary engineering, law and administration services in connection with construction are furnished by the regular staff of the company whose salaries are charged to operating expenses. If they are now treated otherwise it would be necessary to revise the operating expense accounts by excluding a portion of the salaries of the officials concerned and such revision would produce larger net earnings. When a company has once charged off an item as expense it has been reimbursed by the public, which is under no obligations to pay interest upon the item perpetually on the impossible hypothesis that the property is to be reproduced at some one time.
>
> A point is made by counsel that owing to the inadequacy of rate of fare the company has not received a proportionate part of the cost of its property equal to the depreciation or exhaustion of capacity for service. The proof of this point is not convincing. From the exhibit filed by the company subsequent to the last hearing, it appears that the company's earnings were amply sufficient to provide for depreciation as well as an adequate return from 1907 to 1917, inclusive. This is not the case, however, since 1917, owing to the greatly increased cost of material and labor. Seven per cent on the original investment (1 per cent for sinking fund and 6 per cent for return) would amount to approximately $260,000 a year or $780,000 for three years, as compared with a stated income of $346,000 or a deficiency of $434,000. The war conditions of the year since April, 1917, are such as to require of the commission special consideration. The calamity of the war, the impossibility of obtaining labor and material of the proper character except at abnormally high prices, and a limited amount of such as it was possible to obtain, resulting in unusual burdens upon all enterprises of a business character, furnished a reason for assuming that this deficiency of $434,000 under such special circumstances should be regarded by the commission for the present proceedings as a part of the rate base which will then amount to $2,864,000, or 8 per cent on the amount $229,120, although it is not conceded that 8 per cent is an irreducable allowance.

REVENUES AND EXPENSES ALLOCATED

The company's allocation of revenues and expenses to the Utica 6-cent fare zone was as follows:

	1919	1920
Operating revenue	$1,200,335	$1,288,523
Operating expenses	1,029,334	1,169,034
Net operating revenue	$171,000	$119,489
Taxes	73,935	65,000
Operating income (available as return on investment)	$97,065	$54,489

The commission said that on the basis of the 1920 income the company would fall short of the amount required for an 8 per cent return on investment and adequate provision for depreciation by the sum of $196,631, as follows:

Return on investment 8% on $2,864,000		$229,120
Additional for depreciation		36,000
Total		$265,120
Operating income 1920	$54,489	
Adjustment	14,000	68,489
Net addition to be paid by passengers		$196,631

In this connection the commission said:

> It must be borne in mind that we are not dealing with the conditions of 1920, nor the previous abnormal years, but with the present period which is one of profound economical adjustment. It is with this pregnant fact before us that a decision in this and similar cases must be made. The fact is that the proceeds of revised wage relations has already reached this company.

In estimating reductions the commission said it considered only those which were applicable to personnel and did not take into account the reductions in the cost of supplies. As the commission sees it the situation resolves itself into this:

Net addition to be paid by passengers...		$196,631
Adjustment for payrolls of January-April, 1920		66,090
		$262,721
Less expenses which it is estimated will be saved:		
In wages (arbitration award	$74,000	
From one-man car operation	95,000	
On materials and supplies	35,000	
		$204,000
		$58,721

In conclusion the commission said in part:

> It must be understood that even if the company should fall to make up this deficit of $58,721, it would still be earning at the 6-cent fare approximately 6 per cent of its investment and on previous deficiencies and earnings. In addition to the 6 per cent, the company would also be getting a further allowance of $36,000 for depreciation. Under these circumstances, there would be no justification for any increase in fare. Public utilities just as other departments of business must expect to cope with periods of depression and poor earnings just as at other times they enjoy periods of prosperity and full dividends.
>
> If the public is expected to make up every deficiency in order to give a good round rate of earning power then the public is entitled to the benefits of surplus prosperity. While a franchise rate once fixed must not be presumed to me immutable, the reasons advanced for changing it should be of the most controlling character. In this case the local authorities have already conceded an advance in passenger fare from the original franchise rate from 5 cents to 6 cents. The local authorities, therefore, cannot be charged with failure to appreciate the additional revenue requirements of the railroad due to the war conditions.
>
> With the subsidence of these conditions it is not in order for the railroad to be seeking further advances, especially in the form of its present utterly extravagant request for a 10-cent fare. On the other hand, it is the duty of the company so to administer its affairs through economies and improvements that the fare to be charged to the public will be at the lowest possible minimum consistent with good service and an adequate return to the investors.

Emergency Rate Case Hearing Postponed

Appeal proceedings by the city of Minneapolis from the order of the Minnesota Railroad & Warehouse Commission granting the Minneapolis Street Railway an emergency increase in fare from 6 cents to 7 cents have been postponed by Judge E. S. Montgomery of the District Court in Hennepin County to Oct. 24. The restraining order was issued by the court on Sept. 3.

Postponement was asked by the railway company to permit it to produce certain witnesses necessary to proper presentation of its case. The company suggested thirty to ninety days. The city will object to the introduction of figures and testimony at that time other than to show that the company cannot earn enough on the rate of 6 cents to keep up reasonable service and meet fixed charges. Other data will be for presentation before the state commission at a future hearing as to a permanent rate based on valuation of the company's property, a work on which experts for the city and railway company have been engaged for some time.

Interurban Fares Fixed Pending Valuation

An injunction has been issued by the Ingham Circuit Court restraining the Detroit (Mich.) United Railway from collecting more than 1½ cents a mile over four of its interurban lines. The action was taken under the so-called Glaspie bill, which supplants the Smith rate bill under which utilities had been operating in the State. The petition for the injunction came as a result of the company's failure to file a new rate schedule as demanded by the new law. Under the Glaspie bill the Detroit United Railway is not permitted to charge over 1½ cents a mile on its lines until such time as the Michigan Public Utilities Commission has had an opportunity to complete an inventory of its properties and business and fix a permanent rate of fare.

The Glaspie bill was framed and put through the last Legislature by Representative A. B. Glaspie, of Pontiac and Oxford. Representative Glaspie was assisted in the framing of the bill by Judge Glenn C. Gillespie, who has been actively engaged in the prosecuting of several cases against the Detroit United Railway to determine whether that corporation had the right to override existing franchises which were disregarded at the time the Smith rate law went into effect two years ago.

In explaining the changes in fares, Assistant General Manager E. J. Burdick is reported to have said:

> The new rates on all the lines will differ materially from those that have. been in effect through the so-called Smith bill, which is supplanted by the Glaspie measure. The Glaspie measure calls for a temporary reduction on all the Detroit United Lines, according to the utilities commission, to a rate of 1½ cents a mile instead of the 2-cent rate now being charged. While this will largely decrease the cost of riding on the interurban lines, there will, however, be some cases in which the cost of riding will be increased. These increases come through the abolition of the 5-mile zone around the several cities involved, this zone having been created by the Smith bill. In this zone the 2-cent rate was not permitted to apply, except on through fares, and original franchise fares prevailed. There is no zoning outside of the limits of city railway systems under the Glaspie bill.

In connection with this matter the Michigan State Public Utilities Commission has ordered a new appraisal of the properties of the railway for use as a basis of fixing fare rates on its interurban lines. The work will require about six months. Representatives of the company proposed that the commission use the Cooley appraisal but this was declined. Professor Cooley made first appraisal in 1915 and since then the orginal data was supplemented from time to time to make it an up-to-date report.

One-Man Cars for British Columbia

One-man cars will probably be installed in the Vancouver and Victoria systems of the British Columbia Electric Railway shortly. Ten one-man safety cars will probably be purchased to provide additional rolling stock while the rule of the road is being changed at the end of this year. At present it is proposed to operate one-man cars only on shuttle lines in Vancouver, but downtown lines in Victoria will probably be operated the same way at an early date. Representatives of the platform employees have approached the premier of the province, but it is not expected any difficulties will be placed in the way of the company from that source.

Fares Raised Again at Toledo

For the second time within six weeks the fare of the Community Traction Company, Toledo, Ohio, has been increased. Tickets will now sell at the rate of six for 40 cents, or 6⅔ cents each, as against a rate placed in effect on Aug. 1 of eight tickets for 50 cents, or 6¼ each. The cash fare of 7 cents and the 1-cent charge for transfers remains the same, to which point it was raised from 6 cents cash and 1 cent for transfers on Aug. 1.

The company can change its rate of fare every ten days if necessary. It is operated under an ordinance which provides for whatever rate of fare may be necessary to maintain funds for replacements, working capital and amortization and to pay interest charges on its bonds and dividends on its preferred stock. A committee, composed of city and company representatives, meets every ten days to see if the profits are large enough or too large and has full authority to change rates any time it sees fit.

Scenic Route Drops Trolley for the Bus

The Niagara Gorge Railway, Niagara Falls, N. Y., has discontinued its trolley service between Niagara Falls and Lewiston and between Lewiston, Fort Niagara and Fort Niagara Beach. Outstanding tickets, the company announces, will be accepted for passage on the Gray bus lines which are also operated by the Gorge Company. The buses will continue to operate during the fall and winter months on a two-hour schedule.

Explaining its action, the Niagara Gorge Railway says that increasing use of automobiles has reduced passenger traffic over its lines to such an extent that operation now is unprofitable. The company, however, will continue to operate the Niagara Gorge belt line service in co-operation with the Park and River division of the International Railway, Buffalo. On this portion of the line the difficulties of operation would be great during the winter while the tourist traffic would naturally be very light.

A franchise exists for the operation of the Lewiston-Youngstown division of the road which requires the operation of at least two cars a day. On the Lewiston-Falls division the franchise allows for a suspension of service between Oct. 1 and June 1.

Ten-Cent Fare Petition Renewed

The Helena Light & Railway Company, Helena, Mont., has renewed its application before the State Railroad Commission for a cash fare of 10 cents with tickets at 6¼ cent. The company claims that the 8-cent rate with tickets at 5 cents has failed to bring the revenues up to the expenses and further relief is needed.

When the company petitioned last May, the fare was 7 cents. At that time in its decision the commission ordered an 8-cent rate for a period of ninety days.

The proposed 10-cent cash fare applies to the city alone. To East Helena the proposed rate is 15 cents.

Reference to the 8-cent fare award was made in the ELECTRIC RAILWAY JOURNAL, issue of May 28.

Jitneys Appear in Cincinnati

A new bus line has made its appearance in Cincinnati. The "jitneys" are being operated by three local men from Rose Hill to the heart of the city. E. F. Hagaman, William Thompson and Fred Hershiar, after consulting with Mayor John Galvin and other city officials as to the legality of the procedure, made their appearance on Aug. 27 with three automobiles. The promoters disclaim any connection with the Detroit, Mich., promoter who recently received considerable publicity on a similar project, which never materialized.

Mr. Hagaman said the new interests intend to increase the service by the addition of more cars and new routes running over the other arteries of Cincinnati as soon as their business will permit them to do so. According to the present schedule the "jitneys" start at 7 o'clock in the morning and operate at twelve-minute intervals until midnight, Sundays included.

One-Man-Car Issue Before Commission

In a final effort to avert, if possible, the installation of one-man cars on the lines of the Tri-City Railway on the Illinois side of the Mississippi River, Mayor H. M. Schriver and City Attorney John L. Scott of Rock Island, Ill., have been in Chicago several days where they are fighting the case before the Illinois Public Utilities Commission. The officials of the Tri-City Railway are attempting to show that the installation of one-man cars is imperative if the Tri-City Railway is to operate on a profit. Some time ago the Mayor and the City Commission of Rock Island rejected the one-man car type which caused the company to take the case to the Illinois Public Utilities Commission. The company also asks permission to operate the same type of cars in Moline, East Moline, Silvis and Milan. Officials of these cities have joined the Rock Island mayor in the matter. The company first installed one-man cars on the Bridge Line and asked the Rock Island Commission to grant thirty days trial. The company then asked permission to extend the service on the Third Avenue and the Long View lines.

State Powerless Before Jitneys

There is no law for the regulation of rates and practices of jitneys operating between cities and towns of Oklahoma and the State Corporation Commission cannot control such carriers. This conclusion was recently reached after an investigation into the laws relating to transportation companies conducted by E. F. McKay of the commission.

The investigation was started at the behest of the mayors of Dewey and Bartlesville, who stated in their application that they were unable to control the buses operating between both cities and wanted the commission to fix rates and schedules. The matter was referred to in the ELECTRIC RAILWAY JOURNAL for Sept. 3.

Safety Cars for Peoria

Twenty standard Birney safety cars are to be installed by the Peoria Railway, a subsidiary of the Illinois Traction System, during September, for the complete equipment of three lines. These will be the first cars to be operated with one man in Peoria. The installation has been made possible only through a revision of the contract with the local union and an amendment to a city ordinance, both of which contained clauses requiring two-man operation of all street cars.

The new safety cars will be installed on the basis of an approximately 25 per cent increase in number of cars. The Illinois Traction System is now operating cars of the light weight safety type in Champaign and Decatur, Ill., Wichita and Topeka, Kan., and has one-man operation of older cars in a number of other towns.

Guaranteed 6 per Cent Looks Good to Them

The Cleveland (Ohio) Railway has accepted a new franchise for extending its lines on St. Clair Avenue from its present Nottingham Road terminus to Bliss Road, a distance of 1⅓ miles. Construction is to be begun during the next few months. Financing of this extension was a problem that looked to be unsolvable until owners of industrial plants in the territory touched by the extension stepped forward and agreed to buy the company's 6 per cent stock at par. The stock is now selling on the open market around 86, but provision in the company's grant forbids its sale by the company at any figure under par. As the people refused to sanction an increase in the dividend rate to 7 per cent, the company has been unable to finance any other extensions through the sale of stock.

Transportation News Notes

One-Man Cars Prohibited—The Macon Railway & Light Company, Macon, Ga., has been restrained from using one-man safety cars on lines of heavy travel. The City Council first authorized this method of transportation and later rescinded its order.

Fares Back to Five Cents—The City Council of Ironwood, Mich., has voted to reduce the fares on the lines of the Ironwood & Bessemer Railway & Lighting Company from 6 cents to 5 cents. This is the second reduction in three months. The fares were advanced to 7 cents last fall.

Ten Cents Cash Suggested.—The Tri-City Railway & Light Company is reported to have suggested to the city of Muscatine a fare of 10 cents, with books of tickets at 50 cents which would entitle the holder to a 5-cent fare. The effect would be to require the occasional rider to pay a rate commensurate with the service he received, while retaining to the regular patron the benefit of the low fare.

Seven Cents in Phillipsburg. — The Phillipsburg (N. J.) Transit Company has received an order from the Public Utility Commission allowing it to raise the fare from 5 to 7 cents within the town limits. The petition for increased fares was filed on May 4, 1920, and was opposed by the municipal authorities on the ground that the service given by the railway was not up to the standard called for under its franchise ordinance.

Tokens Replace Tickets—The Louisville (Ky) Railway has replaced its paper tickets with metal tokens about the size of a dime. The tickets were sold in strips of five with receipt attached for 35 cents. The tokens will be sold at the same rate while the envelope which contains them is a receipt for 35 cents, and can be used by the patron in the event that the city wins its 5-cent fare suit. In this case the company will have to refund 2 cents on each fare represented by the receipts.

Court Restrains Jitneys. — Electric railways cannot withstand the competition of the jitneys is the opinion of Justice Frank S. Katzenbach, of the New Jersey Supreme Court. The jurist made this anouncement during the mandamus proceedings involving ten jitneys operating between Salem and Pennsgrove. The Salem & Pennsgrove Traction Company brought about the proceedings. It claims that the jitney men had no licenses from the Board of Public Utility Commissioners. Justice Katzenbach upheld the railway and said that the jitneys would eventually drive the traction companies out of business. The jitney men must now suspend operating between the two towns until their applications are approved by the Board of Utility Commissioners.

Personal Mention

Heads Mexican Railroad

H. B. Titcomb, Vice-President of Pacific Electric, Is Chosen President to Succeed Col. Randolph

Herbert B. Titcomb, vice-president of the Pacific Electric Railway, Los Angeles, Cal., was chosen president and director of the Southern Pacific Railroad of Mexico, to fill the vacancy caused by the death of Col. Epes Randolph on Aug. 22, 1921. Mr. Titcomb will have headquarters at Tucson, Ariz., and at Empalme, Mexico. The Pacific Electric Railway is a Southern Pacific subsidiary.

H. B. TITCOMB

Mr. Titcomb, who was elected vice-president of the Pacific Electric Railway, with headquarters at Los Angeles, but three years ago, has been the executive in charge of that property, for since his assuming this position President Paul Shoup has had his office in San Francisco as operating executive of the Pacific system of the Southern Pacific. Mr. Titcomb, in rising to occupy this important place in the transportation world, has earned his advancement step by step through his own individual effort and because of his thorough knowledge of every phase of railroading.

There is a very large field for Mr. Titcomb in his new position with the Southern Pacific, as he is, with his vast experience, most capable to handle the new work before him. In his new capacity Mr. Titcomb is expected to build up the system which spreads its tentacles fan-wise through old Mexico—the system which was wrecked and nearly ruined by the Mexican revolution which preceded the Obregon administration. Countless miles of roadbed were destroyed and the work of rebuilding started by Colonel Randolph will be carried on. Service which became intermittent must be restored. These tasks lie within the keeping of the road's new chief executive, whose work in handling the Pacific Electric affairs during the three years at the head of its organization has been very commendable.

No one has at this time been appointed to the post vacated by Mr. Titcomb with the Pacific Electric lines.

Mr. Titcomb has spent thirty years of intensive service with the Southern Pacific Company. Graduating from Cogswell Polytechnic College in 1891 he entered the service of the Southern Pacific as a draftsman, working up from this position to assistant engineer of the construction division in 1898. He was appointed roadmaster of the Western division a year later and was successively roadmaster of the Shasta and Sacramento divisions from 1900 to 1904. After serving as assistant resident engineer he held a like position until 1906 at San Joaquin, and at Los Angeles from that time until 1909. Mr. Titcomb was then promoted to district engineer at Los Angeles, holding this position until 1914, when he was made maintenance of way assistant to the assistant chief engineer at San Francisco. In 1917 he became superintendent of the Stockton division, going from there to Los Angeles to become vice-president of the Pacific Electric.

Mr. Titcomb was born in Indianapolis, Ind., in 1871, but as a small boy he came to California and located on a farm with his parents in Modesco.

Mr. Smith Resigns from McGraw-Hill Company

F. E. Smith, having finished the work for which he was especially engaged about eighteen months ago by the McGraw-Hill Company, Inc., has resigned his office as controller of the company. He is returning to Fort Myers, Fla., where he has real estate interests and where he will resume his connection with the First National Bank of Fort Myers, which he gave up in 1918 to join the Emergency Fleet Corporation. Mr. Smith is a past president of the American Electric Railway Accountants' Association, and was for fifteen years auditor of the Chicago Union Traction Company and of its successor, the Chicago Railways. He resigned from the Chicago Railways in 1914 when he moved to Florida. Mr. Smith's special work with the McGraw-Hill Company, Inc., was to prepare and put into operation a system of accounts including monthly cost statements.

M. B. Baer, formerly chief clerk of the traffic department of the Bamberger Electric Railroad, Salt Lake City, Utah, has been appointed general soliciting agent for the road. Mr. Baer has been in the employ of the company for the past five years. The position of chief clerk will be filled by Loney Flint, a newly added member of the personnel.

Mr. Cooper Resigns

Has Been Secretary of Southwestern Electrical & Gas Association for Nine Years

H. S. Cooper, who has been secretary of the Southwestern Electrical & Gas Association for the past nine years and has also been a public utility advisory engineer in Dallas, has resigned his secretarial office. He is planning now to take a vacation to which he is undoubtedly entitled after thirty-five active years in the public utility business. Mr. Cooper was one of the organizers of the Southwestern Electrical & Gas Association and served a term as president before he became secretary in 1912.

H. S. COOPER

Mr. Cooper is a native of the Isle of Wight in England, where he was born in 1856. In 1876, after he had moved to America, he began the manufacture of agricultural machinery and shortly thereafter entered the electrical field. In 1893 he was appointed general manager of the Schenectady properties of the Electrical Development Company, which consisted at that time of the electrical and gas lighting and the railway systems of Schenectady, all of which were then in the hands of a receiver. Later these properties were reorganized and placed on a paying basis by Mr. Cooper. Subsequently he directed the rehabilitation of the Ithaca (N. Y.) Railway, and later became connected with the Electrical Development Company in New York. In July, 1904, he accepted the position of general manager of the Galveston City Railway, and continued with that company and its successor, the Galveston Electric Company until 1910. About this time he was retained to supervise the design and construction of the new Hotel Galvez at Galveston. In 1912 he was elected secretary of the Southwestern Electrical & Gas Association.

New York Commission Appoints Mr. Vanneman Chief Engineer

The New York Public Service Commission on Sept. 20 announced the appointment of Charles R. Vanneman as chief engineer of the commission. Mr. Vanneman was with the old Public

Service Commission of the Second District up to the time of the creation of the present commission. He was appointed in 1910 to the old commission as inspector of transportation. His new position as chief engineer places him in charge of engineering and inspection work for the commission of all steam railroads, street railroads, grade crossings and electric light, gas, telephone and telegraph companies throughout the state.

A Public-Spirited Service

Infrequently, indeed, are the virtues of the street railway manager extolled in the daily press. It might be claimed that they have none worthy of mention. Perhaps they haven't, but they just succeed without them. However, there is a little appreciative and sympathetic paragraph that appeared recently in the Boston *News-Bureau* showing that it has some realization of what transportation men have been confronted with during the past few years:

> There is a man in Boston who is doing valiant service in the public interest whose work is not receiving the praise it deserves. Reference is made to Homer Loring, who, for a paltry salary of $5,000 as trustee, is struggling to keep the Bay State Street Railway on its financial feet. The employees, the public and the security holders are quick to condemn him for any situation which doesn't happen to fit in with their own particular idea of how to run a street railway. Mr. Loring courageously sticks to his job and doesn't allow ignorant criticism to "get him." He did not accept the thankless task because he wanted it: he doesn't need the salary and he is on his third year of service, although he had agreed to accept but one. He will probably retire at the end of the current year and the road will lose one of its real assets. He has long been an advocate of "service at cost" and it is to be regretted that with the generally disturbed conditions of business since the property was reorganized, his theory has not had a fair chance to demonstrate its possibilities.

M. D. Payne, who has been superintendent of transportation in Gadsden division of the Alabama Power Company for several years, has been transferred to Duncan's Riffle, Ala., having been sent there to help in railway construction.

Charles L. Edgar, president of the Edison Electric Illuminating Company, Boston, has been elected president of the New England section of the N. E. L. A. Mr. Edgar has been prominently identified with N. E. L. A. work, both in the national and local organizations, for a number of years. He has served several times as vice-president of the N. E. L. A. and was president in 1903.

E. Arnold has been appointed master mechanic of the Cleveland Alliance & Mahoning Valley Railroad, Ravenna, Ohio. He is the successor to W. C. Carter, who recently resigned. Mr. Carter has not as yet accepted any other connection. Mr. Arnold was at one time connected with the Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio, having entered their employ in 1904. He remained there until September, 1919, when he resigned to go with the National Tube Company, Lorain, Ohio. It was the latter company that he has just left to become master mechanic of the Cleveland, Alliance & Mahoning Valley Railroad.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE
MANUFACTURER, SALESMAN AND PURCHASING AGENT
ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Cut in Cement Prices

Reduction Made of 30 Cents a Barrel—Production During August Increased

Announcement was made last week to the effect that manufacturers have taken off 30 cents a barrel on the price of cement. Although there had been reason to suspect that some price change might occur before the first of the year the trade had not been expecting it to come so suddenly nor with so much precision. It became effective simultaneously with the issuance of the announcement, first by the Atlas Portland Cement Company, and was immediately followed by similar price cuts by other cement manufacturers.

The dealers immediately followed suit with a reduction in price to their customers. Instead of the quoted price today being $3.00 to $3.20 a barrel, the dealers are now asking $2.90.

The reason for the price cut, it is said, is that important savings have been made by the Atlas Portland Cement Company in the cost of manufacturing its product. It has passed the benefit of these savings on to its customers. These savings have been effected by greater efficiency among the mill employees, resulting in lower costs of production. Coal and other raw materials are cheaper.

Some of the biggest buyers stated that as the new cut narrowed manufacturers' margins almost to the vanishing point, a condition of stabilization might soon be expected as far as prices were concerned. The prediction was made that by spring cement prices would rebound. In fact, the general trend of the market continues to be toward a higher price level in spite of the fact that normally prices begin to weaken at the approach of autumn.

Production and shipments of Portland cement in the United States continued to increase during August, 1921, and, according to available statistics, scored new high records for that month. The August production exceeded the average for August, 1917-1921, by about 15 per cent. Production for the first eight months of 1921 was about 99 per cent of the quantity produced during the corresponding period of 1920 and exceeded the average for the first eight months of 1917 to 1921 by about 8.5 per cent.

As is usual in summer, the August shipments exceeded production, and the total for the eight months just ended was equivalent to more than 99 per cent of the record quantity shipped in the first eight months of 1920. The average for the same period during the five years 1917-1921 was exceeded by about 9.5 per cent.

Stocks of finished cement at mills at the end of August were approximately 8,280,000 bbl., compared with 8,941,000 bbl. on Jan. 1, 1921, and with the average of about 9,600,000 bbl. for August during the last five years.

Higher Steel-Sheet Base Does Not Affect Electrical Sheets

Toward the end of last week most of the prominent independent manufacturers of sheets advanced their prices $5 per ton. Black sheets went from 2.75 cents to 3 cents, galvanized from 3.75 cents to 4 cents, and blue annealed from 2.25 cents to 2.5 cents per pound, Pittsburgh base. Considerable booking was done before the old price was cleared off the boards. At this time the leading sheet producer has not made any advance in price to the new bases taken by the independents.

As far as can be learned, there has been no advance in electrical steel sheets for magnetic use. This market is still quiet, although it is reported better than it was in the early summer. Under this condition it is considered unlikely that a higher price will be placed on it at this time unless it reacts in that direction through the influence of the general sheet market.

Gear Cases in Good Demand

Although one or two manufacturers of gear cases report that the demand for their product is still below the average and that electric railways seem to be making no attempt to provide for their winter needs, the majority of producers have found conditions considerably more favorable and are making what are considered good sales. As has been the rule in the electric railway industry for the past few years, their purchases have been only of sufficient volume to satisfy current needs. However, this volume of buying is said to represent a sizable total.

Under the present condition of the industry it appears as though activity in the gear-case line had come early. Undoubtedly it has to a certain extent and some give the explanation that requirements to replace those lost by breakage last winter were practically nothing, as track and roadway conditions were exceptionally favorable. Since this winter demand was almost negligible, and railways in most cases kept buying so close to actual needs that they were not left with heavy stocks; they are now obliged to replace much equipment that will not survive any longer. Also these advance orders indicate that some railways are in slightly better financial condition and that some money is being expended in anticipating the winter's needs, especially for equipment that has been neglected and is likely to be wanted on short notice.

A good volume of advance orders is yet expected from lines that have only covered their present needs, and with the raw material supply improving and a constantly better attitude on the part of labor it is hoped that prices may be reduced. Prices under present conditions, however, are as low as it is possible to make them, manufacturers state. Stocks are good on both sheet steel and malleable iron cases, consequently deliveries are not awaiting any manufacturing processes. The fact that numerous inquiries are incoming is certainly indicative of an ever improving market.

More Interest in Labor Saving Shop Tools

The fact that some dealers and manufacturers of labor saving tools and machinery such as coil winding, armature banding and commutator slotting machine report numerous inquiries for this type of shop equipment can be interrupted as indicating that whenever possible electric railways are anxious to provide themselves with such apparatus as will enable them to lessen maintenance and repair costs. The tendency, it is reported, is to purchase and install these labor saving devices because the beneficial effect of their use is quickly apparent in respect to their high quality of work, labor saving and the decreased time rolling equipment is out of service.

As far as manufacturing conditions are concerned, there have been no changes recently, although it is stated that readjustments will be made as soon as costs permit. Deliveries can be made in a reasonable time, since all raw material is readily obtainable. Plants turning out this sort of machinery are running at from one-third to one-half capacity.

Electrical Materials Little Affected by Higher Cotton Prices

With the higher cotton prices which have been holding quite steadily for the past two weeks at just under 20 cents a pound, there has been some inquiry as to whether or not certain electrical materials containing cotton have reacted to higher levels or are liable to go there in the near future. So far as can be learned, there has been no advance in general. The exceptions found are in flat insulations. Certain woven white tapes have been marked up 4 per cent, and one brand of sheet varnished cambric is reported 15 per cent higher. No change was noted in varnished cambric tape, insulated wires and cables or non-metallic flexible conduit. Local reports of higher prices on loom and insulated wire are undoubtedly the result of local conditions in distributing channels and not of the increase in raw material prices.

Rolling Stock

British Columbia Electric Railway, Vancouver, B. C., will probably purchase 10 one-man safety cars to provide additional rolling stock while the rule of the road is being changed at the end of the year from left-hand running to right-hand running.

Holyoke (Mass.) Street Railway states that it expects to purchase 2 motor buses in the near future. No information is given in regard to the type or seating capacity of the vehicles that it contemplates ordering nor is any mention made of the kind of service in which they will be employed.

Track and Roadway

Boston (Mass.) Elevated Railway has placed an order for 900 tons of girder rails, 200 tons of standard T rail and 1,250 pairs of rail joints. The Bethlehem Steel Company will supply this material.

Houston (Tex.) Electric Company will start on improving its lines if the new franchise is approved by the city at the election on Oct. 4. This statement was recently made by Luke C. Bradley, district manager of the Stone & Webster Company in Texas.

Tulsa (Okla.) Street Railway and the Oklahoma Union Railway will rearrange their routings so as to utilize the undergrade crossing at Quannah Avenue. This crossing was recently ordered constructed by the State Corporation Commission. The order required the City of Tulsa and the Missouri, Kansas & Texas Railway to join in the construction of two crossings over the Katy right of way in Tulsa.

Chattanooga Railway & Light Company, Chattanooga, Tenn., is rebuilding its Alton Park line from Main Street to Twenty-Eighth Street with 6-in. 100-lb. rail, which represents 4,981 ft. of single track and 286 ft. of double track. The East Chattanooga line is being rebuilt from Jefferson to Stewart Street with 4½-in. 70-lb. rail. It involves a length of 1,228 ft. of double track and 5,341 ft. of single track.

Portland Railway, Light & Power Company, Portland, Ore., recently completed reconstruction and improvement work on East Twelfth Street, and the intersections of East Eleventh and East Twelfth and Hawthorne Avenues, at a cost of $60,000. A number of carlines have been re-routed and in many cases the installation of new curves and other special work has eliminated the use of switches and cross-overs. The company also has under way other reconstruction work that will cost $36,000.

Columbus Railway, Power & Light Company, Columbus, Ohio, has contracted for and expended in general improvements $2,908,498 since the present fare ordinance became effective (April 3, 1920), according to a recent statement by C. L. Kurtz, president of the property. Doing away with overhead high-tension wires and substituting underground conduits in the downtown section have cost $650,000. An expenditure of $381,000 was made for repairs to the intersections of Chittenden Avenue, Naghten, Chestnut and Spring Streets with Fourth Street. Increasing the capacity of power stations has cost $1,315,000 and new substations have cost $450,000.

Power Houses, Shops and Buildings

Dallas (Tex.) Railway is installing new concrete pits in its repair beds at the East Dallas carhouse. These pits will greatly facilitate repair work.

Pacific Electric Railway, Los Angeles, Cal., proposes to build a freight house and station on Philadelphia Street just west of Whittier Avenue, Whittier.

Harrisburg (Pa.) Railways recently placed a contract for two Heine boilers of 600 h.p. equipped with Coxe stokers and also conduits for new coal bunker at central power station. These boilers are expected to be in service by Jan. 1, 1921.

New Orleans, La., H. K. Johnson, builder of the Orleans-Kenner interurban line has filed application with Commissioner Paul Maloney of the Department of Public Utilities for a franchise for an electric light and power plant in the city of New Orleans.

Boston (Mass.) Elevated Railway has applied to the Public Utilities Commission for permission to establish a station and shelter, with approaches, tracks, etc., adjoining Lechmere Square, Cambridge, for the convenient transfer of passengers between cars operating through the Boylston Street Subway, Tremont Street Subway and over the viaduct from the North Station in Boston to Lechmere Square in Cambridge.

Professional Notes

Coverdale & Colpitts, consulting engineers, 66 Broadway, New York, announce the engagement as a member of their staff of George W. Burpee, formerly managing engineer of Westinghouse, Church, Kerr & Company, and lately of its successor, Dwight P. Robinson & Company. Mr. Burpee is a member of the American Society of Civil Engineers and of the Engineering Institute of Canada.

F. H. Sauter, formerly associate editor of the Locomotive Dictionary, has accepted a position with Gibbs & Hill, consulting engineers, New York City. His work with this firm will have to do with the development of railway electrification. Mr. Sauter was connected with the General Electric Company from 1894 until 1903, when he joined the Schenectady Railway as assistant master mechanic. At one time he was also in the service of the American Locomotive Company, Schenectady, N. Y., where he held various positions including those of designer of steam and electric locomotives.

Trade Notes

George W. Thomas, president and cofounder of the R. Thomas & Sons Company, East Liverpool, Ohio, manufacturer of insulators, died on Aug. 7, 1921, at the age of seventy.

Automatic Reclosing Circuit Breaker Company of Columbus, Ohio, has announced the opening of a Philadelphia office at 1613 Chestnut Street, Philadelphia, Penn. H. A. Van Dyke has been placed in charge of this office.

Barney & Smith Car Company, Dayton, Ohio, has been recommended by its receiver, Valentine Winters, that further operations at the plant be discontinued and that the plant be sold. Mr. Winters informed the court that since the receivership was established the loss to the plant has been $157,330. What further action has been taken by the receivers has not yet become known.

U. T. Hungerford Brass & Copper Company, 510 Arch Street, Philadelphia, has purchased the merchandise stock of the A. P. Swoyer Company and has leased the premises formerly occupied by it at 17 North 7th Street, Philadelphia. Possession was taken by the Hungerford Company Sept. 1. It is intended to carry a full line of brass, copper, tobin bronze, nickel silver and monel metal products in sheets, rods, tubes, wires, etc.

Henry C. Esling, secretary of the J. G. Brill Company for the past thirteen years, died on Sept. 18, at his home in Philadelphia after a brief illness. He was fifty-eight years of age. Mr. Esling was a member of the Philadelphia bar and prior to his affiliation with the electric railway car-building industry was associated in the practice of law with Francis Rawle. He was a director of the Pennsylvania Manufacturers' Association Casualty Insurance Company and of the Beneficial Savings Fund Society of Philadelphia.

New Advertising Literature

Safety Limit Switch.—A new crane safety limit switch, known as type LC, has been put on the market by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

Oil Circuit Breakers.—The Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa., has issued special publication 1643, entitled "Application of Oil Circuit Breakers."

Motors.—The Mechanical Appliance Company, Milwaukee, has issued bulletins Nos. 401, 402, 403, 404 and 405, covering the "Watson" direct-current motors, alternating-current motors, multispeed motors, slip-ring and high-torque motors and ball bearing motors respectively.

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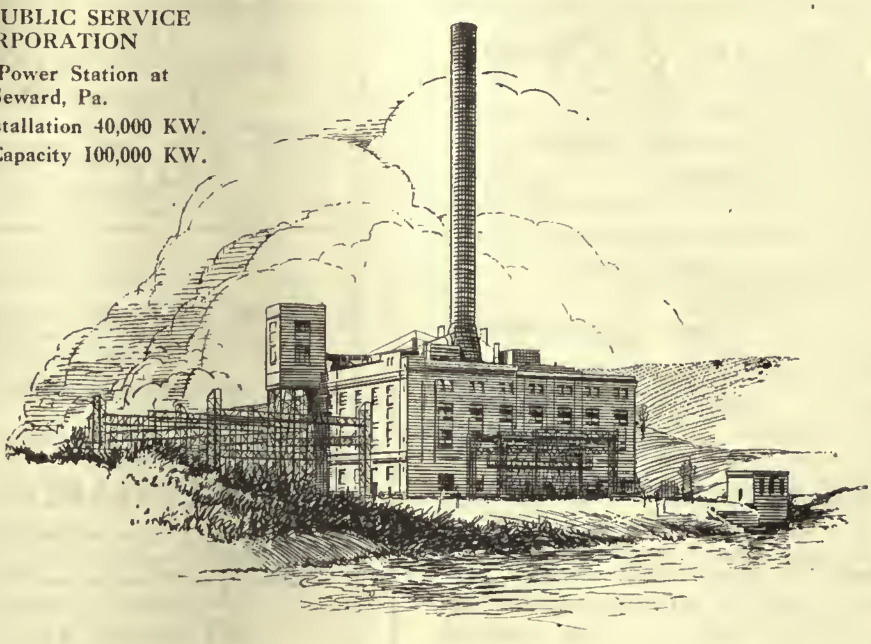

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1 to 3 in.,	$4.50 an in.	15 to 29 in.,	$3.90 an in.
4 to 7 in.,	$4.30 an in.	30 to 49 in.,	$3.80 an in.
8 to 14 in.,	$4.10 an in.	50 to 99 in.,	$3.70 an in.

POSITIONS VACANT

EMPLOYMENT

POSITIONS WANTED

POSITIONS VACANT

ALL round working general foreman wanted, for small road in Middle West, must have had experience in shop, line and track work. Be able to take care both electrically and mechanically W.H. 508 and 101 B and G.E. 258 A and C equipment. Married man with small family preferred. Good position for capable, industrious man and *no other*. Must be well recommended. P-346, Elec. Ry. Jour., Old Colony Bldg., Chicago, Ill.

COMMERCIAL manager. The man we want is not fully developed in the street railway business. He may not be a street railway man even, but if selected he must be a "go-get 'er." His duties will be to increase business. He will be required to sell rides in large numbers. Doing that he may have to create the reason for the ride. Salary as high as your qualifications. In reply tell what you would do to merchandise transportation on a street railway. How would you do it and can you do it? Applications confidential of course. P-342, Elec. Ry. Journal, Real Estate Trust Bldg., Phila.

EXPERIENCED man wanted for few days to make inventory small street railway property. State experience, references, age, salary and when available. Address, Ogdensburg Street Railway Co., Potsdam, N. Y.

STATISTICIAN wanted; must have several years' experience in electric railway classification and have wide knowledge of financial and operating units and results in large eastern cities of U. S. State salary expected. P-343, Elec. Ry. Journal, Real Estate Trust Bldg., Phila., Pa.

WANTED—A first class armature winder foreman. Man capable of handling a large winding room and familiar with all modern methods. Location Central States. P-335, Elec. Ry. Journal, Leader-News Bldg., Cleveland, O.

Wanted by
Ateliers de Construction Oerlikon
Oerlikon (Switzerland)
for
Department Appareils for Railways
in consequence of ease of death.

CHIEF ENGINEER
(favoured Citizen of Switzerland)

with Experience in Construction and Calculation for switch plants and appareils for Railways with monophase alternating and direct current system.
State references, age, salary expected and when available should be addressed
Direction of
Ateliers de Construction Oerlikon
Oerlikon (Switzerland)

In Replying to "Blind" Ads

be careful to put on envelope the key number in the ad and also local address of office to which reply is sent

10th Ave. at 36th St., New York.
935 Real Estate Trust Bldg., Phila.
533 Leader-News Bldg., Cleveland.
1570 Old Colony Bldg., Chicago.
531 Rialto Bldg., San Francisco.

Important

Original letters of recommendation or other papers of value should not be enclosed to unknown correspondents — send copies.

0195

POSITIONS WANTED

ENGINEER or designer on electrical car equipment; six years' experience; thoroughly familiar with strength of materials and electrical engineering; moderate salary asked. PW-338, Elec. Ry. Journal.

POSITION wanted by experienced armature winder or controller man; six years' experience. PW-348, Elec. Ry. Jour., Real Estate Trust Bldg., Phila., Pa.

PRACTICAL trackman of nearly 30 years' experience desires change and position as superintendent of tracks or roadmaster. Can handle any track proposition; seven years in one of largest cities in United States; very best references. PW-917, Elec. Ry. Journal.

VALUATION engineer, graduate E. E. University of Illinois; completing valuation work for large public utility, street railways, gas, electric, water, ice and steam heat properties; 4½ years' experience maintenance, construction and valuation U. S. A. and abroad. PW-344, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

SUPERINTENDENT; 17 years' railway experience in Eastern Ohio, technical training, desires change, qualified to assume entire charge. PW-347, Elec. Ry. Jour., Leader News Bldg., Cleveland, O.

SUPERINTENDENT of transportation with a proven record of 17 years with large city and interurban properties, desires a change. Very successful in dealing with public and labor and knows how to get results from employes. High grade references as to character and ability. Would prefer a good size city property. Relations with present employers pleasant and satisfactory. Personal reasons for desiring change. Address with details. PW-336, Elec. Ry. Journal, Old Colony Bldg., Chicago.

SALESMAN AVAILABLE

YOUNG man familiar with the requirements of electric railways, desires connection as salesman with well established supply house. AS-345, Elec. Ry. Jour.

BOOKS & PERIODICALS

Magazines Wanted

Back numbers of Electric Railway Journal wanted from 1910 to date. The H. W. Wilson Co., 964 University Ave., New York, N. Y.

WE WANT
4—DOUBLE DECK
Snow Plows
Rotary Nose or Shear

TRANSIT EQUIPMENT CO.
Cars—Motors
501 Fifth Avenue, New York

FOR SALE

1—10 Ton, 3-Wheel Monarch
Steam Roller
Practically New. Used 1 Job.
Has Scarifier attached.

McLACHLAN BUILDING COMPANY
11201 Cottage Grove Avenue, Chicago, Ill.

"Opportunity" Advertising:

Think
"SEARCHLIGHT"
First!

0099

Brand New Tool Steel Gear and Pinion Company's Gears

G. E. 70 and 80 Solid Gears, 4 in. bore, 69 teeth, 3 diametral pitch—5 in. face—23.667 O.D.
G. E. 70 and 80 Solid Gears, 4½ in bore, 69 teeth, 3 diametral pitch—5 in. face—23.667 O.D.
G. E. 201 Solid Gears, 5½ in. bore, 71 teeth, 3 diametral pitch—5 in. face—24.333 O.D.
W.H. 56 Solid Gears, 4 in. bore, 64 teeth, 3 diametral pitch—5 in. face—22. O.D.
W.H. 514 Solid Gears, 5 in. bore, 64 teeth, 3 diametral pitch—4 in. face—22. O.D.
Lorain 27 Solid Gears, 4 in. bore, 67 teeth, 3 diametral pitch—4½ in. face—23. O.D.
W.H. 306 Solid Gears, 5½ in. bore, 69 teeth, 3 diametral pitch—5 in. face—23.667 O.D.
G. E. 80 Solid Gears, 3⅞ in. bore, 69 teeth, 3 diametral pitch—5 in. face—23.667 O.D.

31 in. **Rolled Steel Wheels.**
Boiler Tubes—4 in. seamless, No. 10 BWG, 18 and 20 feet long.
Connection Boxes—BJ-343, Form H manufactured by General Electric Company.
Ball Bearings—for W. H. 506 Armatures.
Bellmouths—1½ in., complete with gaskets.
Linen Tape—¾ in. bias oiled, .007 thick. In 5½ in rolls.
Cotton Sleeving—No. 3 White.
Commutators—W. H. 101-B, complete with shells. W. H. 56, complete with shells.
Heaters—Round Electric Consolidate No. 192.
Flat Electric Consolidate No. 144 LL.
Fields—W. H. 101-B
Wire—No. 10 D. C. C. Magnet.
Mica—2 in. x 4 in. Amber.
Headlights—Imperial incandescent, type SDP, manufactured by Crouse-Hinds Company.

(All of the above material new)

1—Second hand Springfield Wheel Grinder, capacity 36 in. wheels.
1—Second hand West Tire Setter, with hydraulic pump, for setting tires on all size wagon Wheels.
1—New Sprue Cutter, 24 in. wheels, to cut ⅞ in. square cast iron—power driven.

ATTRACTIVE PRICES.

PHILADELPHIA RAPID TRANSIT COMPANY
***Purchasing Dept.*—820 Dauphin Street, Philadelphia, Pa.**

Maybe You've Dubbed Him "Lucky"—

the man whose electrical equipment seems always to be running smoothly.

As a matter of fact, he has his troubles, but they're little ones. At the first sign of disorder, he promptly calls a competent repair organization—it's invariably NELSON—and the trouble is repaired quickly, expertly, at small cost, and without unnecessary loss of time by shut-down—because it's done where the equipment is.

Have you equipment troubles *now?* It doesn't matter where you're located. Nelson's expert repair forces go anywhere—the ends of the earth are the limit. And no job is too big; nor too small. Have the job done before it becomes costly. ***Write, Wire or Phone***

I. R. Nelson Company
1 Bond Street, Newark, N. J.

OVERHAUL SERVICE

Plan to have Nelson look over your equipment periodically—it's good insurance against costly shut-downs.

ARMATURE COILS

are Nelson's specialty. They are the finest available—in all sizes for any type of equipment—standard and special.

RELAYING RAILS

500 Tons, 80 Lb. A.S.C.E. Rails.

1200 Tons, 70 Lb. A.S.C.E. Rails.

1250 Tons, 60 Lb. A.S.C.E. Rails.

Angle Bars for all of the above rails. Material equal to new and ready for instant shipment from stock.

Low prices will be made

KARASIK, FRIEDMAN & CO., Inc.
Woolworth Bldg., N. Y.

Buyers—
Send me your inquiries!

Steel Tee Rails

Locomotives
Steam Shovels
Cars

Sell me your surplus

E. C. SHERWOOD 50 Church St.
New York

---

700 tons new 9 in.

GIRDER RAIL

Penna. Steel Co. Section 228, 107 lb. to the yard. Attractive price upon application. Subject to R. W. Hunt & Company's Inspection. Prompt shipment.

H. M. FOSTER COMPANY
Continental Building, Baltimore, Md.

For 20 Years

we have been
Buying and Selling

Second-Hand Cars

Trucks and Motors

At Your Service

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa

"Searchlight"
is
Quick Action
Advertising

0233

FOR SALE OR TRADE

INTERPOLE MOTORS

In Stock

General Electric			Westinghouse		
8	201	60 hp.	4	304	90 hp.
22	new 203P	60 hp.	18	306 CV	65 hp.
4	205	100 hp.	4	323	40 hp.
20	210	70 hp.	16	327	40 hp.
28	217	40 hp.	2	506	25 hp.
4	219	50 hp.	4	548	100 hp.
24	247	40 hp.	30	101 B2	40 hp. non inter.

We also have in stock every type of non-interpole motor

AN UNLIMITED ASSORTMENT OF COMPLETE CARS
TRUCKS CONTROLLERS

TRANSIT EQUIPMENT COMPANY

501 FIFTH AVENUE, NEW YORK

BOILER PLANT *For Sale*

We offer for sale all or part of a boiler plant consisting of twelve 1000 H.P. Edge Moor Boilers built A.S.M.E. code for 200 lbs.—Foster Superheaters—Taylor Stokers—Diamond Soot Blowers—extra heavy piping—three 250 ft. x 16 ft. self-supporting Steel Stacks—two 12,000 H.P. Cochrane Feed Water Heaters—complete with coal and ash handling machinery—used three to six months—subject to your inspection—a bargain.

Roy Brenholts, *Trustee*, 1015 Outlook Bldg., Columbus, O.

Boilers—in stock (*Reconstructed*)

Babcock & Wilcox Water Tube—Sizes 150 to 524 Hp.

Air Compressors

Direct Connected Generating Units

Tubular Boilers—Tanks—Stacks—Pumps

H. P. BREARLEY, 89 West St., New York

IMMEDIATE DELIVERY

2—1000-Kw. Westinghouse Synchronous Motor Generator Sets

Motor end—1400 kva. 2300/4000 volts, 80% P.F., 3 phase, 60 cycle, with direct connected exciter.

Generator end—1000 kw. interpole design, 600 volt, 1666 amp., speed 514 r.p..m.

2—300 kw. 25 cycle, 3 phase, ROTARY CONVERTERS 360 volts A.C. 600 volts, D.C., 500 r.p.m. with 15000/360 volt transformers. Will sell with or without the transformers. Can sell at very low price.

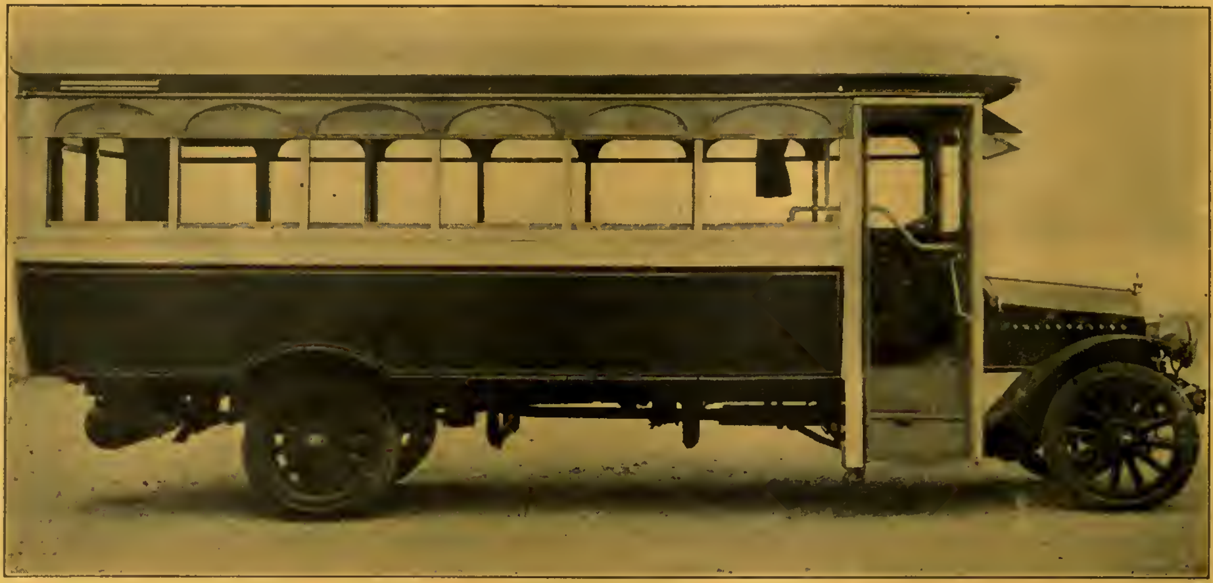
Outfits were built to operate continuously under 35 degree rise in temperature.
Send for further details and prices.

ARCHER & BALDWIN, INC., 114 LIBERTY ST., NEW YORK CITY
Telephones 4337-4338 Rector

TRACKLESS TRANSPORTATION

Advertisers In This Section

- Atlas Truck Corp.
- Day-Elder Motors Corp.
- Duplex Truck Co.
- Haskelite Mfg. Corp., The
- Heywood-Wakefield Co.
- International Motor Co.
- Pantasote Co.
- Paterson Vehicle Co.
- Republic Truck Sales Corp.
- Trackless Transportation Corp.
- Vreeland Motor Co., Inc.
- White Co., The



A Vast Improvement in Bus Design

An example of Mack engineering genius solves an important transport problem

THE MACK SPECIAL SHOCK INSULATED BUS embodies a new type of spring suspension intended for use on busses equipped with solid tires. The new and exclusive feature is the use of rubber, in the suspension of both front and rear springs, as an effective shock *insulator.*

This equipment combines riding qualities equivalent in comfort to those afforded by busses equipped with pneumatic tires with a cost of operation even less than that of busses equipped with solid tires. The life of the chassis and body is materially lengthened as they enjoy the same ease of riding as do the passengers.

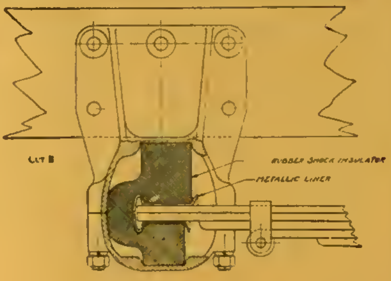
Moreover, there is no friction at the points of spring suspension, thus eliminating shackle lubrication and wear. The usual need for a spare tire is done away with.

Smaller diameter solid tires and a special body construction, place the floor directly on the frame, lowering the centre of gravity of the body, making it easier of access and eliminating side sway and tendency to overturn. The low lines of the bus are apparent in the above cut.

All standard bodies and many special body features are offered in this new Mack bus. Complete details, specifications, standard and optional equipment will gladly be given upon request. Address Room 00.

INTERNATIONAL MOTOR COMPANY
25 Broadway, New York

PERFORMANCE COUNTS

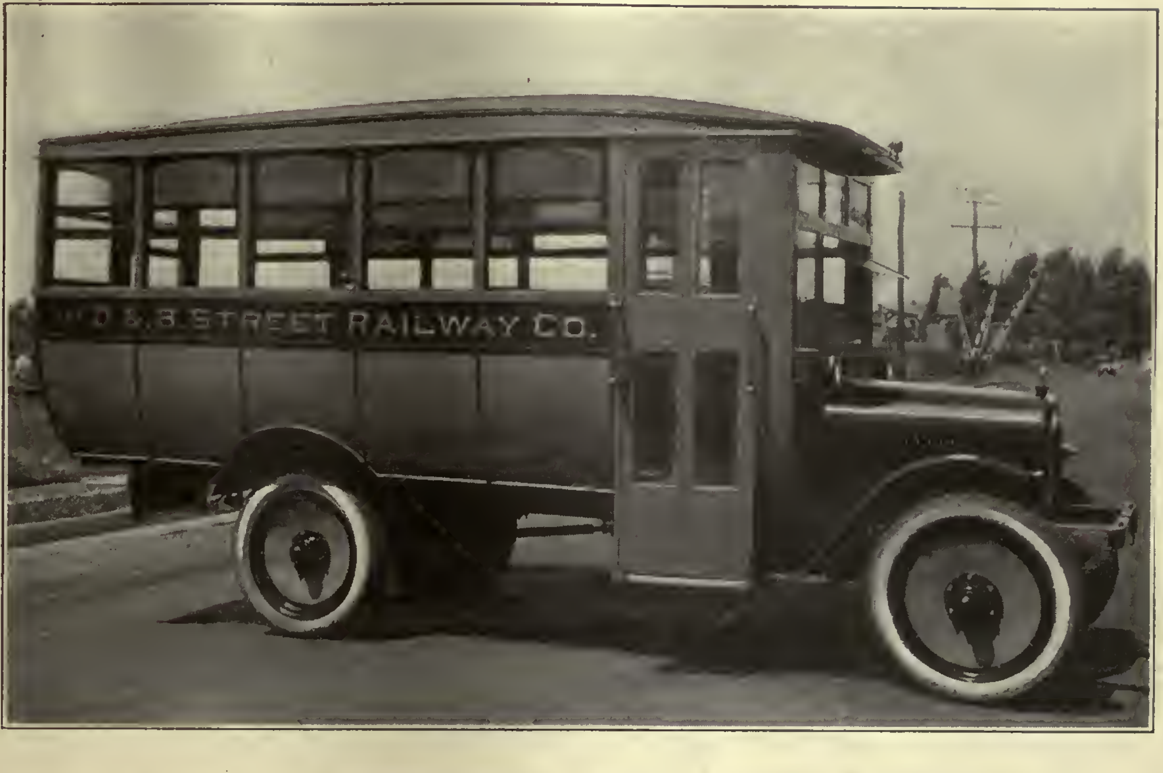


Front end rear springs

THE ends of the springs are imbedded in blocks of rubber which are carried under compression in housings attached to the spring brackets. Notice the evidence, in the construction, of characteristic Mack strength.

Mack
TRUCKS

Capacities: 1½ to 7½ tons.
Tractors to 15 tons.



PATERSON
Standard Bus Bodies

Every railroad man appreciates the tremendous value of these two most important factors in equipment construction—*light weight and standardization.* We offer a most carefully designed and finely-constructed standard body for any make of chassis you may choose.

The Paterson Standard Transit Bus Body shown in the illustration has just been adopted by the Danbury & Bethel Street Railway of Connecticut. The frame is of selected stock oak and ash, substantially reinforced at all joints with iron forgings. Swell-side panels of finest grade auto-body steel are used to cover the frame. The entire body is thus constructed to give the lightest possible total weight consistent with durability.

Lift type sash, equipped with our anti-rattling device—they are absolutely noiseless. Electric dome lights, signal push buttons, advertising racks and other refinements. Seating arrangements, upholstery and exterior painting optional with purchaser.

Start Right—Standardize!

If you are considering any form of motor bus operation, use only standardized, light-weight bus equipment. It will result in lowest operating and maintenance costs. Send now for our specifications and quotations.

Paterson Vehicle Co.
Paterson, N. J.

THE IMPERIAL OMNIBUS

Your Opportunity to Lead the Procession

Face Facts!

Motor-bus transportation is here to stay. The people want it. They want to ride, and they have to ride, and are willing to pay for riding—but under certain circumstances they want a run for their money—in a motor bus.

You know, and we know, that they need street railway service, too. The motor bus in its proper sphere should not—in fact cannot—entirely supplant the street cars. But the motor bus can furnish and is furnishing in many places, a supplementary and not infrequently a superior service to the street cars. And it is also proving its usefulness in complementary service extending transportation facilities to communities not reached by the street railway.

Get into the business yourself, Mr. Railway Man! You have the transportation organization, the knowledge and the experience which the outsider lacks. And what is more, you've got existing capital investment at stake. Give the people what they want, and you'll not only save your present investment, but will make it more useful than ever to the public.

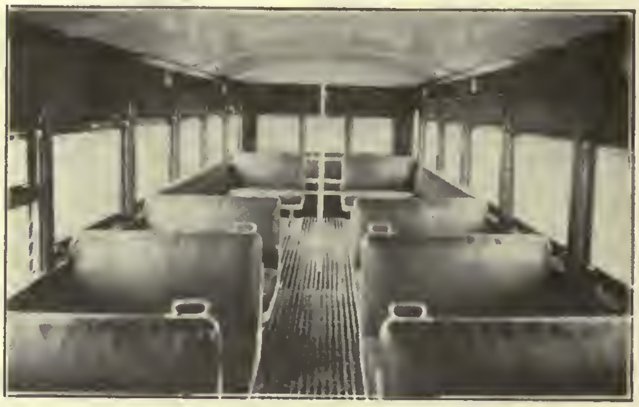
Don't wait for some irresponsible competitor to show you the way by taking the cream of the transportation business and leaving you the skim-milk! Lead the procession, don't follow it!

Pioneer—Don't Copy!

The man who is a successful pioneer in any field generally succeeds in proportion to his courage in blazing out a new trail where no trail previously existed. So too, the motor bus which is to show the way as a standard in this new field cannot be a mere adaptation of equipment used for trucking freight. The Imperial Omnibus is a new departure, from the ground up.

TRACKLESS TRANS
300 Madison Ave.,

Originators of the Low



THE IMPERIAL OMNIBUS

An Exclusively Passenger Car From the Start

From the first stroke of the pencil in its design, the Imperial Omnibus has been planned and built exclusively for passenger transportation service.

An especially designed channel-section frame of maximum strength forms the foundation on which this car is built. Engine specially designed for Motor Bus Operation. The rear axle carries 65% of the weight, on a 71 inch tread.

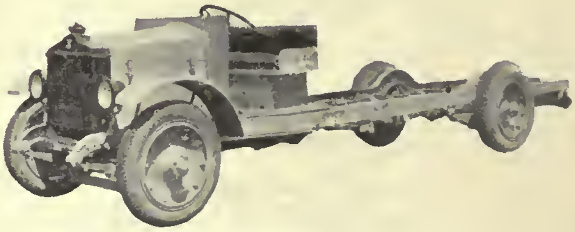
The steel body is unique in its low-hung mounting. As the "originators of the low center of gravity omnibus" we call your particular attention to the fact that the floor of the Imperial Omnibus, without passenger load, is only 26 inches above the ground. This, with the wide tread, makes an over-turn of the Imperial Omnibus almost a physical impossibility.

Note the interior arrangements in the illustration. The Imperial Omnibus is as roomy as the ordinary small street car which it resembles, but is far more comfortable and sumptuous in appearance. Large windows permit unobstructed view, at the same time giving a brightly-lighted interior. An electric light system and an exhaust ventilating system are part of the standard equipment.

The Imperial Omnibus is built in four styles—20-, 25- and 30-passenger single-deck, and 49 passenger double-deck types.

The Thing to Do Now Is—

write us for full details and specifications. We will gladly quote prices and furnish you with information about places where the Imperial Omnibus is already in actual service.



PORTATION CORPORATION
New York, N. Y.

nter of Gravity Omnibus

HASKELITE

BUS ROOFS

Strength

In a recent test a Haskelite roof carried safely a load of 7 men without damage or failure. Compare the strength of this type of roof with the weakness of the pulp wood or slat construction. The strength of the Haskelite roof means greater durability in service. It means fewer replacements—these roofs are less easily damaged. Buses are less frequently laid up in shop for repairs of roof or of interior damage due to leaky roofs.

Weight Reduction

The use of Haskelite roofs enables the motor or trolley bus builder to reduce the weight of the roof about half pound per square foot.

Reduced Cost of Construction

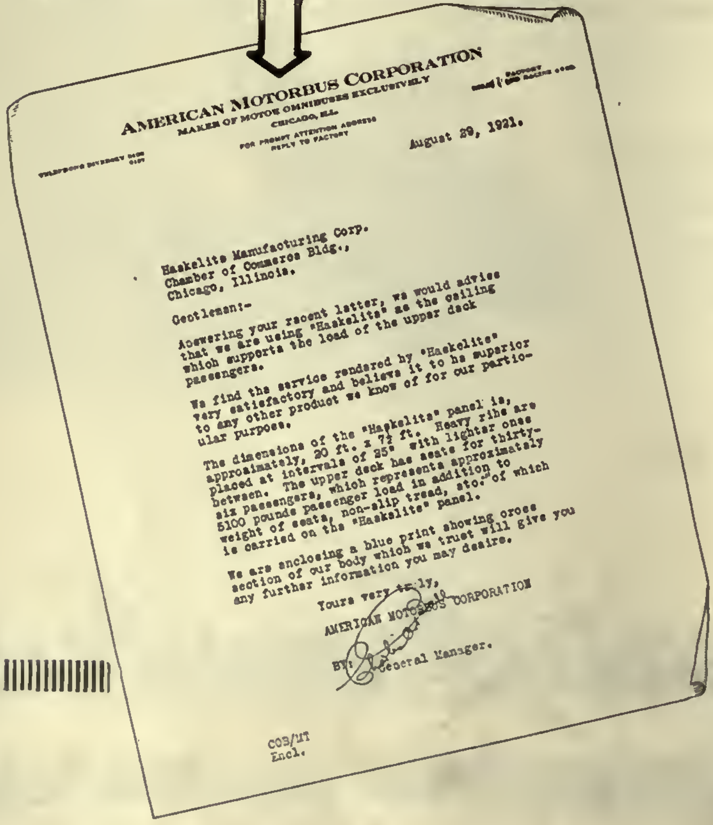
Haskelite roofs are furnished moulded all ready to apply and finish. With the old type of slat construction each piece had to be sawed, fitted and nailed into position. Then planed down to eliminate all ridges—an expensive operation.

Haskelite panels are used also for headlinings, bulk heads, seats and interior lining. Haskelite is specified in the new Detroit Trolley Buses. In this connection the *Electric Railway Journal* reports "the roof is to be made of wood or Haskelite so that persons can be supported thereon without damage to the roof."

Haskelite is used extensively by the Denver Tramway Co., Kuhlman Car Co., Chicago Surface Lines, Twin City Transit Co., and others.

Let us submit quotations on Haskelite Roofs for *your cars and buses.*

Read this letter from the American Motor Bus Corporation, Chicago



AMERICAN MOTORBUS CORPORATION
MAKER OF MOTOR OMNIBUSES EXCLUSIVELY
CHICAGO, ILL.
FOR PROMPT ATTENTION ADDRESS
REPLY TO FACTORY

August 29, 1921.

Haskelite Manufacturing Corp.
Chamber of Commerce Bldg.,
Chicago, Illinois.

Gentlemen:-

Answering your recent letter, we would advise that we are using "Haskelite" as the ceiling which supports the load of the upper deck passengers.

We find the service rendered by "Haskelite" very satisfactory and believe it to be superior to any other product we know of for our particular purpose.

The dimensions of the "Haskelite" panel is, approximately, 20 ft. x 7½ ft. Heavy ribs are placed at intervals of 25" with lighter ones between. The upper deck has seats for thirty-six passengers, which represents approximately 5100 pounds passenger load in addition to weight of seats, non-slip tread, etc. of which is carried on the "Haskelite" panel.

We are enclosing a blue print showing cross section of our body which we trust will give you any further information you may desire.

Yours very truly,
AMERICAN MOTORBUS CORPORATION
BY: General Manager.

COB/MT
Encl.

Haskelite Mfg. Corp.
133 W. Washington St.
Chicago, Illinois

Write us for information on PLYMETL, the ideal material for side paneling.

White Busses for Extending Service

WHITE Busses operated by electric railways as feeders and auxiliaries are increasing the revenue of many companies by opening up districts not yet sufficiently developed for car service.

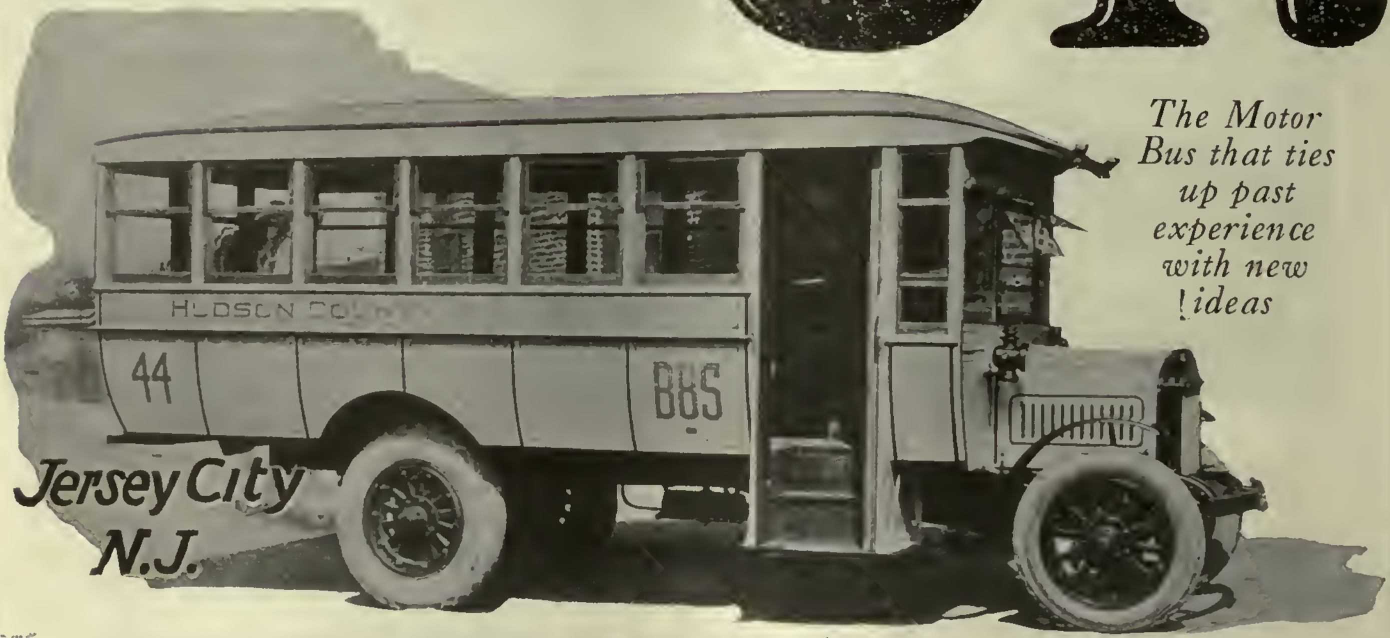
Such bus lines bring in a substantial direct profit. In addition, they increase revenue by bringing to the tracks a large number of passengers who would otherwise not be able to patronize the cars.

White Busses are singularly fitted for this service because they have the *dependability* to maintain the most rigid schedules; the *economy* to insure the lowest possible operating cost; the *durability* to stay on the job day after day and year after year.

THE WHITE COMPANY
CLEVELAND

White Busses

"Ult



The Motor Bus that ties up past experience with new ideas

For Transportation Efficiency
Light Weight and High Acceleration

Your experience has shown you that for efficient transportation of passengers, a light-weight, quick accelerating car is a necessity. For the frequent stops of urban passenger service, no heavy, slow moving vehicle can be successful.

Our experience in automobile construction has enabled us to produce a motor bus which has these essential characteristics thoroughly developed. We knew that a motor truck itself would not do, although its strength and reliability features are desirable. So we took the most successful features of motor truck design and founded on them a specially-built bus to meet the new and higher requirements. We were the first truck manufacturers to build special models for bus service and still lead the field in this development.

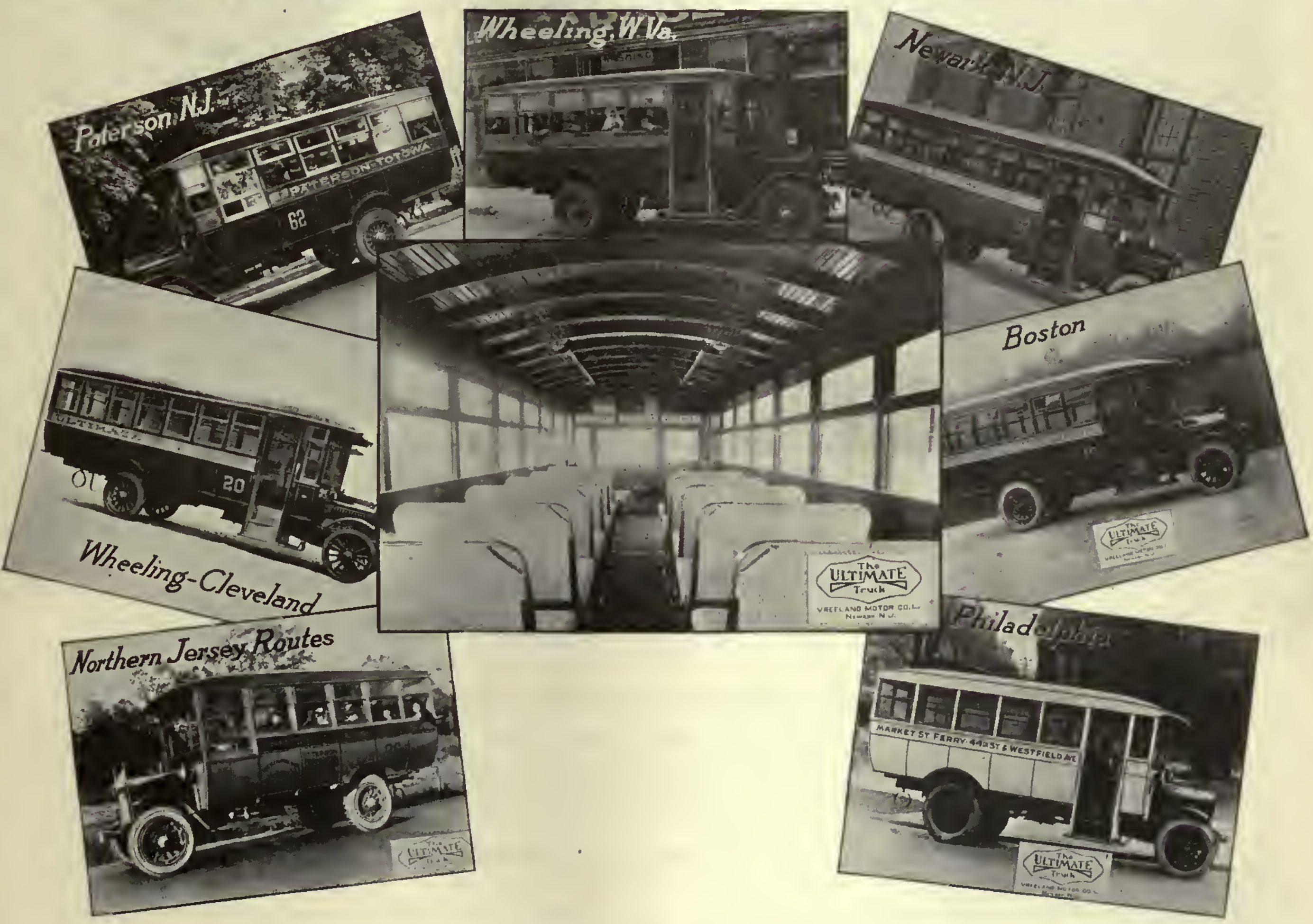
The "Ultimate" has an unusually large and powerful motor, permitting a high gear ratio. Transmission has four speeds forward and one reverse. Second speed is much faster than the "first" in ordinary three speed transmissions, and the car can always be started from a full stop on second, even when loaded. This combination ensures very rapid acceleration, from a dead stop. The "Ultimate" gets over the ground, accelerating rapidly to 30 miles per hour if desired. Is free from vibration at higher speeds.

Note especially the light-weight feature, 154 lbs. per passenger capacity.

The
ULTIMATE
Truck
TRADE MARK REG U S PAT OFFICE

VREELAND MOTOR
Newark,

imate"



The Motor Bus Which Is Established in Service

The above illustrations show seven of the many different bus lines in service using "Ultimate" Motor Buses. We offer not only an equipment which has behind it years of successful motor truck experience, but one which also has already proved itself successful in the new field—passenger service.

Write for specifications and prices

COMPANY, Inc.
New Jersey

The ULTIMATE Truck
TRADE MARK REG U S PAT OFFICE

REPUBLIC

KNIGHT-MOTORED BUS

REPUBLIC

SMALLER CAPITAL INVESTMENT, greater economy in operation, and flexibility in service, are the present important considerations for Public Utility Companies.

After a complete study and investigation of the leading motor bus centers of the World, notably London and New York City, the World's Largest Exclusive Truck Manufacturer has designed and constructed the Republic Knight-Motored Bus to meet these particular needs.

In creating the Republic Knight-Motored Bus provision has been made for the following essentials:

1. Uninterrupted service.
2. Riding comfort.
3. Body low to the ground.
4. Large door opening.
5. Wide aisles.
6. Comfortable seats.
7. Attractive appearance.
8. Rapid acceleration.
9. Superior braking facilities.
10. Low operating expense.

Public Utility Companies are cordially invited to discuss their problems with the Manager of our special Public Utilities Division, in confidence and without obligation. Write today for information.

REPUBLIC TRUCK SALES

Meets the Particular Needs of Public Utility Companies

THE MOTOR BUS, that is economical and dependable, has come to stay.

As a feeder to electric railway lines, as a carrier in congested city streets, it appeals to Public Utility Companies, on account of the small capital investment required, the great economy of operation, and great flexibility of movement.

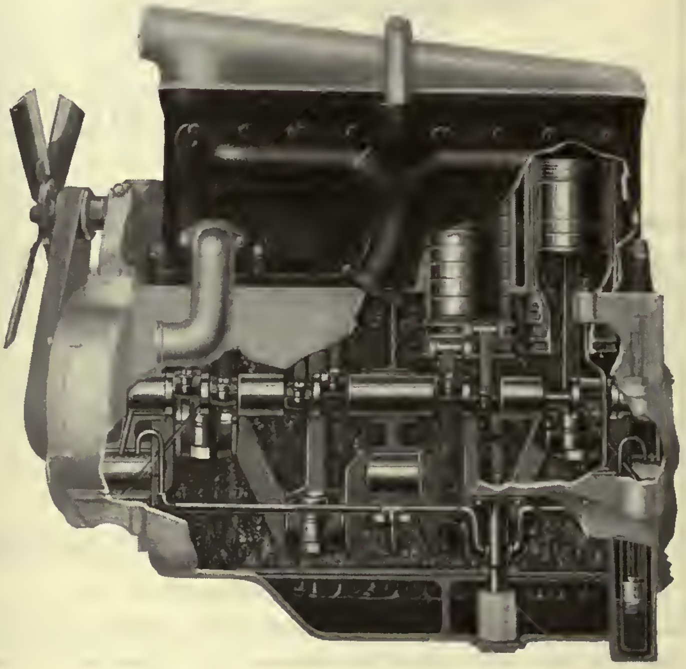
The Republic Knight-Motored Bus is built to meet the most exacting requirement. It is fitted with the Knight Sleeve-Valve Motor—the engine that has proven its superiority in motor bus operation over a long period of years in London and New York City.

The Knight Motor is frugal of fuel, simple in construction, and quiet in operation. It requires no adjustments and actually improves with use.

The chassis is of pressed steel, especially designed for passenger transportation. Springs are of chrome vanadium steel. Transmission is four speeds forward and reverse. The wood frame work of the body is of the best grade white ash. Electric lights, starter, illuminated destination sign and step are standard, as are cushion wheels and tires.

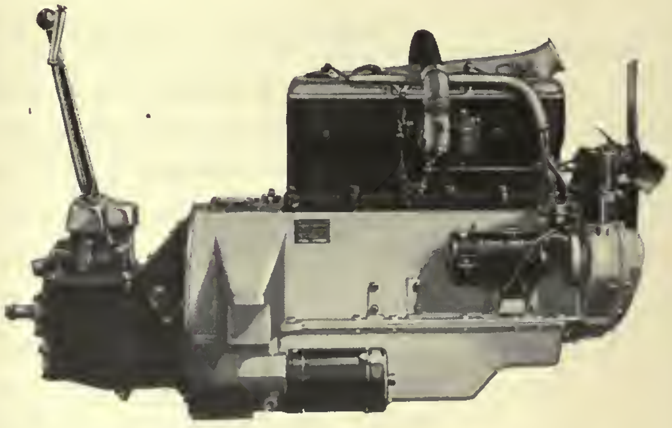
The convenience of the travelling public has been provided for. Riding comfort is assured under all loads. The body is low to the ground—28 inches above street level. The door is 28 inches wide and permits easy ingress and egress. There is head room clearance of 6 ft. 3 in. Seats have ample width, liberal aisle space. Upholstery is optional, of either leather fabric or rattan. There are cross-seats for 17 passengers and longitudinal seats for 8.

The Republic Knight-Motored Bus is as efficient in performance as it is attractive in appearance. It assures dependable highway transportation at low initial and operating cost.



The KNIGHT SLEEVE-VALVE MOTOR

Simple, quiet, powerful. In this motor, metal cylinder sleeves—the one within the other—slide up and down on a film of oil. Gases enter and exhaust through ports in these sleeves. Cams, springs, tappets are eliminated. Motor is so free from wear that it almost never needs adjustment.



The KNIGHT SLEEVE-VALVE MOTOR

Cylinder head is round with spark plug in top center. This gives the greatest possible power and results in gasoline economy. The small amount of carbon forming on the sleeves actually improves compression.

CORPORATION, Alma, Michigan

The DAY-ELDER Motorbus

It Sells By Unbiased Comparison

If you will make a careful comparative analysis of our motorbus, both from the technical standpoint of engineering design and the equally important standpoint of those necessary factors in selling transportation such as comfort, attractiveness, safety and economy, we are satisfied that the Day-Elder will sell itself on its own merits.

Your especial attention is called to the rear axle, the weak point in so many motor cars. Day-Elder success in the past is in no small measure due to the powerfully rugged rear axle with worm-drive, now recognized as the most reliable, quiet and smooth-operating means of transmission of power.

The springs are of our special construction, insuring easy-riding and supporting the frame in such a way that the danger from the bending side stresses of the ordinary suspension are avoided. These compensating springs, worm drive, and a transmission system and engine of the finest design, all combine to make the Day-Elder Motorbus a car of marked superiority for the safe and comfortable transportation of passengers.

DAY-ELDER D WORM DRIVE E MOTOR TRUCKS
TRADE MARK REGISTERED

DAY-ELDER MOTORS CORPORATION
Newark, N. J.

President Gadsden Says:

"And what of the railways and the motor bus?"

"I can't see any answer to this question except that the railways themselves must adopt and use the motor bus in its correct economic sphere. It may sometimes mean running motor buses at a loss, but it is better to run them at a small loss than to be forced to run cars on rails at a higher loss. The motor bus certainly has a field as a feeder, as an auxiliary service, and probably in the handling of peak loads where it does not pay to install extra trackage. Competition, unregulated or regulated, will bring no good to either system of transportation."

Electric Railway Journal

A Scientific Study of Bus Transportation Requirements

The Research Department of the Duplex Truck Company has made a special study of the motor bus for municipal transportation as well as for long haul work.

Having successfully worked out scores of motor bus surveys in large cities as well as in small towns, we are in a position to furnish much accurate, valuable information.

This information covers costs of installation, costs of maintenance, costs of operation, what profits can be earned under given conditions.

In our surveys we take into consideration and actually figure out a proposition based on your local conditions as to gas and oil costs, wages, possible number of routes or hauls, peak load periods, etc., etc.

Duplex builds a special chassis for motor bus work only.

We would be pleased to furnish you with a survey of your local requirements. Furthermore we will be glad to make a special survey for you, based on your local conditions, at no cost to you.

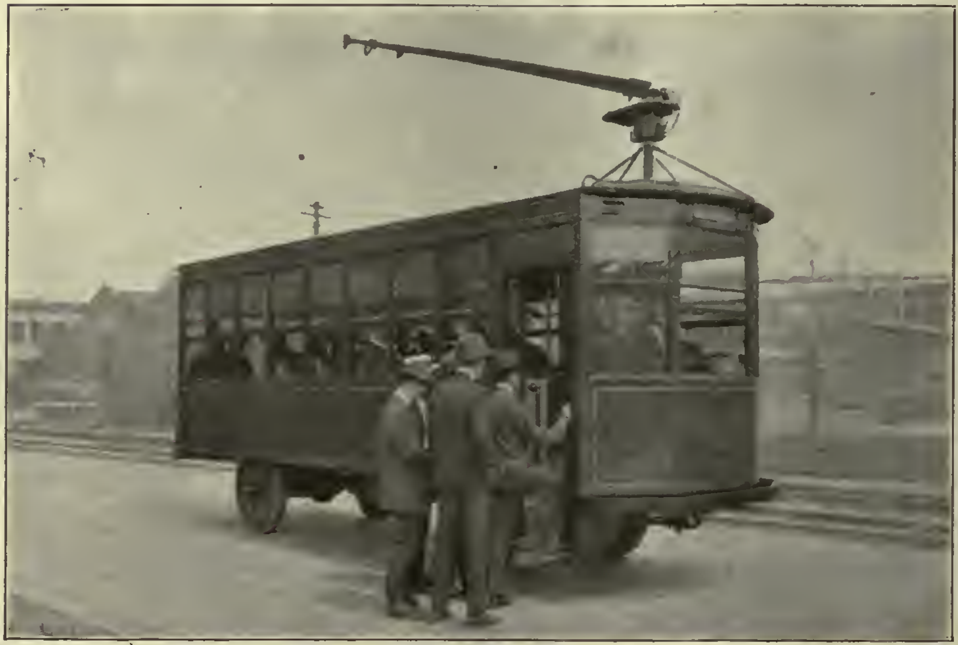
Duplex Truck Company, Lansing, Michigan

DUPLEX
BUILT FOR BUSINESS
TRUCKS

Motor Bus Specialists

THE ATLAS

America's First



To Sell More Rides—Extend Your Lines and

Save $30,000 to $100,000 per mile

Don't let competitors get a foot-hold in new territory or take away from you potential revenue, merely because the available business at this time will not support the cost of track construction. Even open track will require an investment of $30,000 or more per mile, while high grade paved track may cost over $100,000.

In Europe the trackless trolley has been solving this problem successfully for years for both private companies and municipally owned tramways. Now it's available for American companies. You have the power plant, the carshops, the organization—everything but the track and the cars—with which to go after more business and more profit.

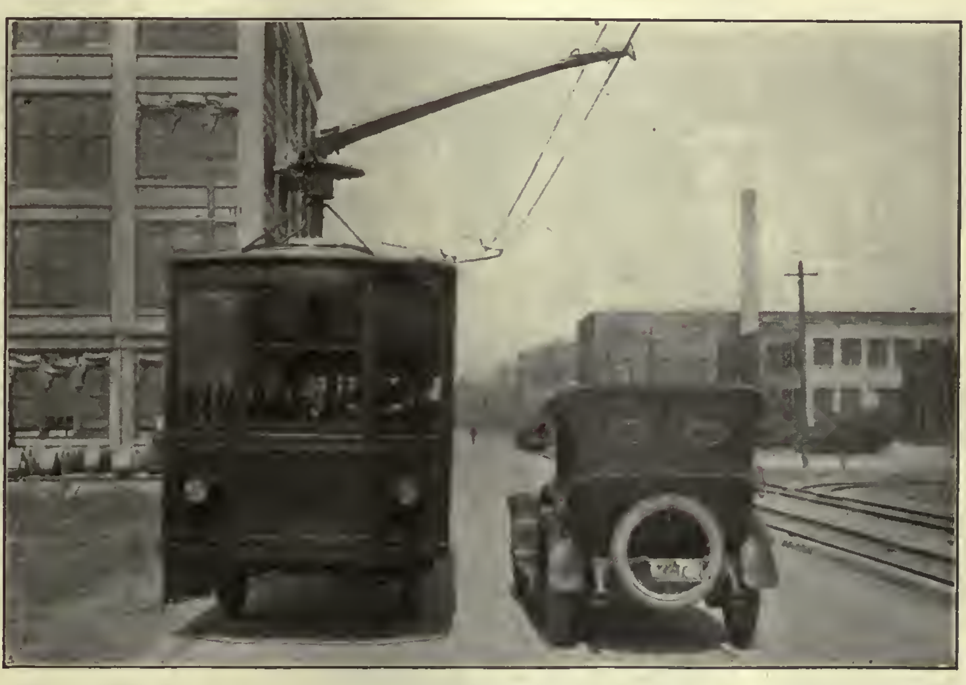
The answer is—you don't need additional track, and the cars are inexpensive, if you use the ATLAS "TROLLIBUS."

One is now in service in Richmond, Va., and the first complete installation in America will start operation at Staten Island, New York, on or about October 1.

THE ATLAS TRUCK

"TROLLIBUS"

Successful Production



Improve Service with the "TROLLIBUS"

A Most Economical Vehicle

The power cost including transmission is less than with any other type of vehicle. You can deliver electric energy to the "Trollibus" through a wire, for about half the cost of gasoline fuel. Lubrication requirements are only a fraction.

The life of the "Trollibus" is longer and its maintenance is cheaper. Inspection and repairs on the "Trollibus" will fit in easily as a part of your carshop routine, because the electric motors are the standard railway type, and the "Trollibus" has other familiar equipment.

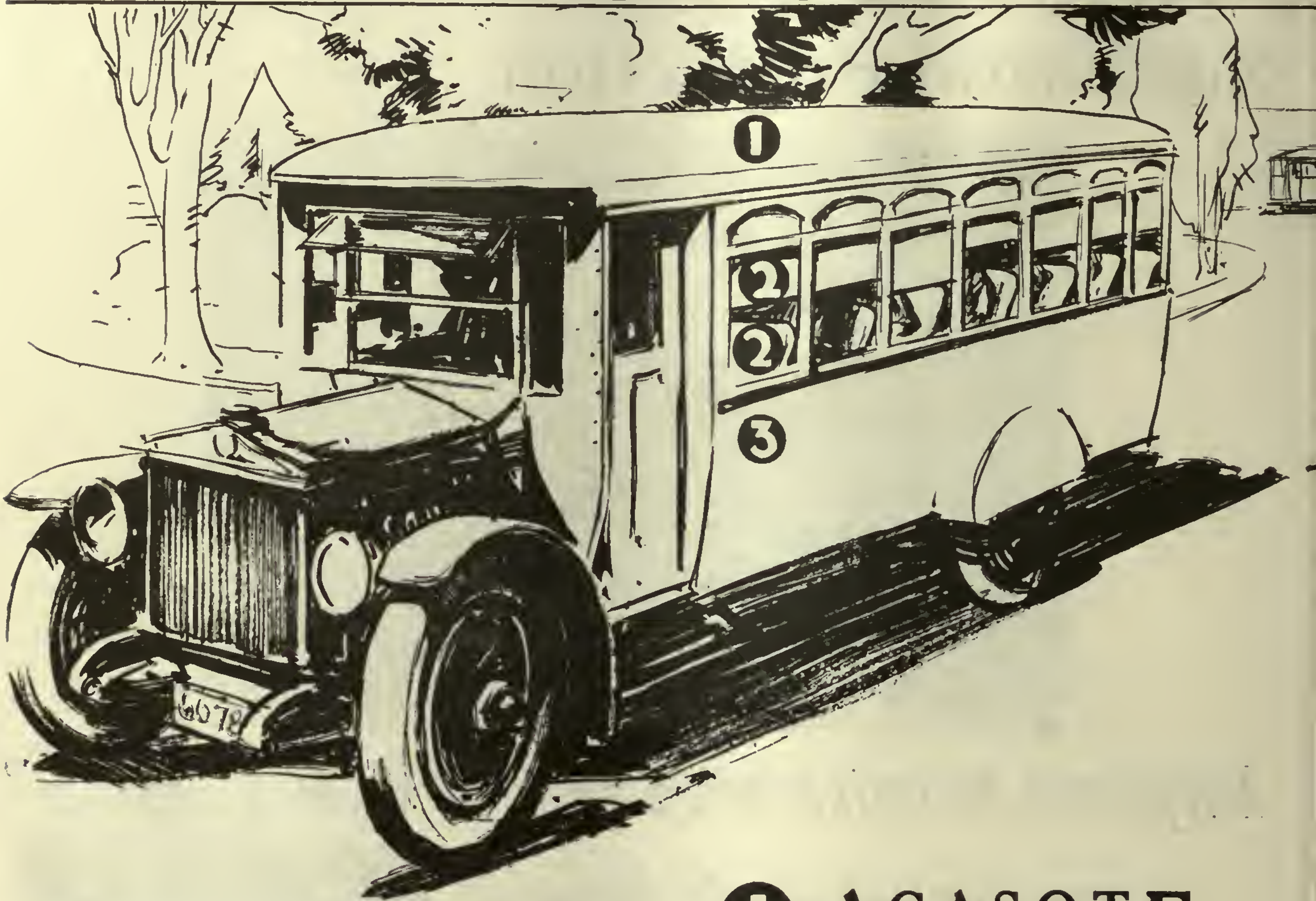
It starts smoothly and runs quietly—no gears to shift in starting, no clutches to slip or jerk, and no engine to run while the car is standing.

A second trolley wire is used on trackless routes. The Atlas Trollibus can also operate on one wire wherever the railway tracks run, by means of an adapter which returns the current to the rails. Thus the "Trollibus" can be transferred to any part of the system without the double trolley wire.

Send for data on costs of operation.

CORP., York, Penn.

FOR MOTOR BUS



❶ AGASOTE
(Trade Mark)

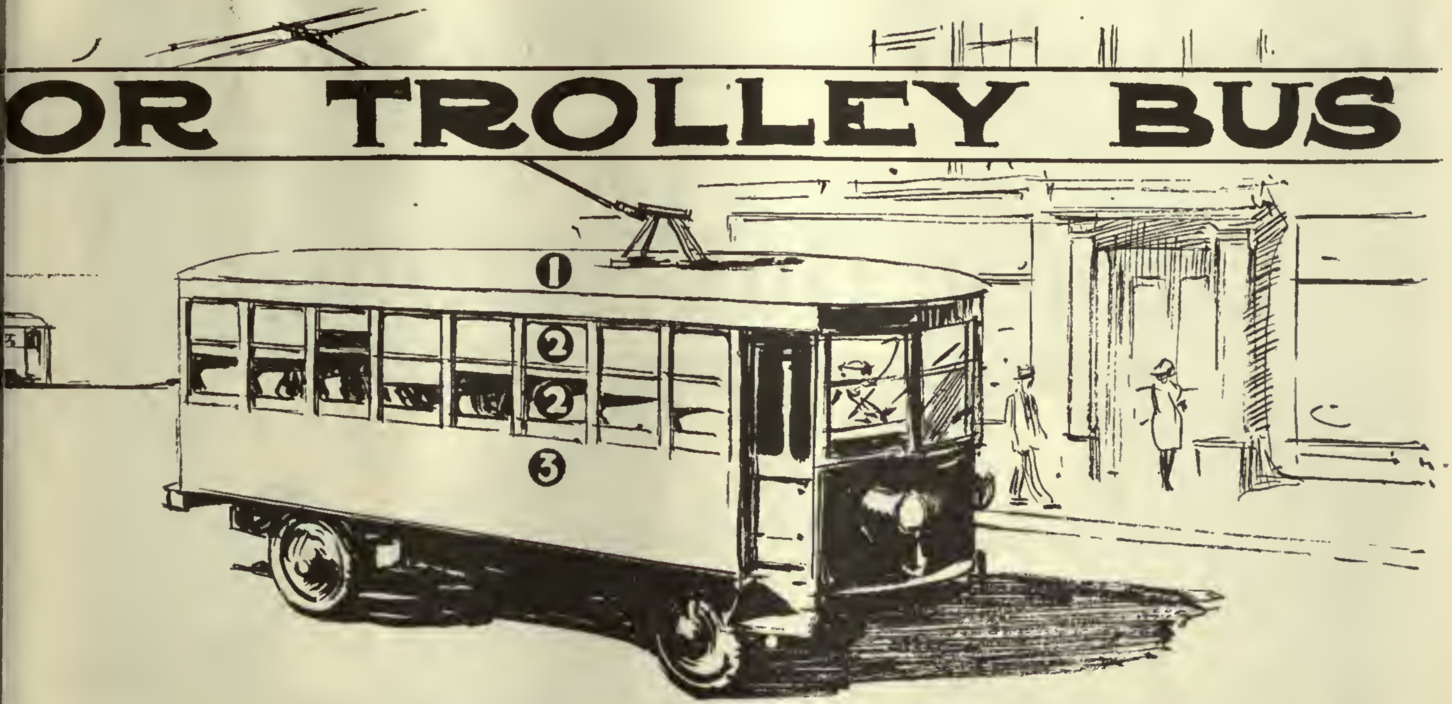
❷ PANTASOTE
(Trade Mark)

❸ STEELASOTE
(Trade Mark)

THE PANTASOTE
11 Broadway

Peoples Gas Bldg., Chicago

OR TROLLEY BUS



AGASOTE
(Trade Mark)
for roofs, headlining and wainscoting

PANTASOTE
(Trade Mark)
for curtains and upholstery

STEELASOTE
(Trade Mark)
for side and end panels

COMPANY
New York

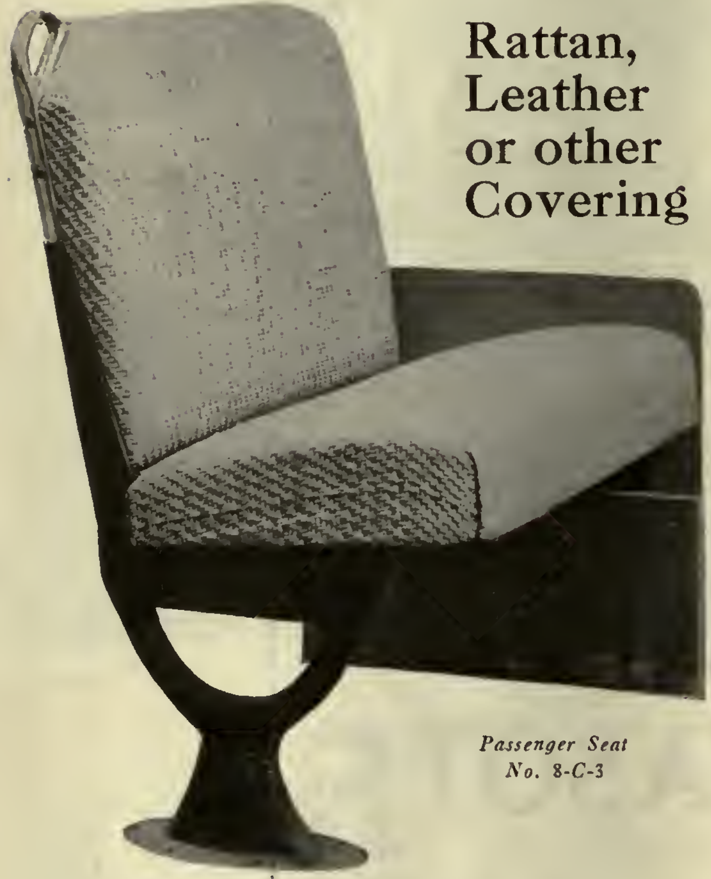
751 Monadnock Bldg., San Francisco, Cal.

Heywood-Wakefield Company

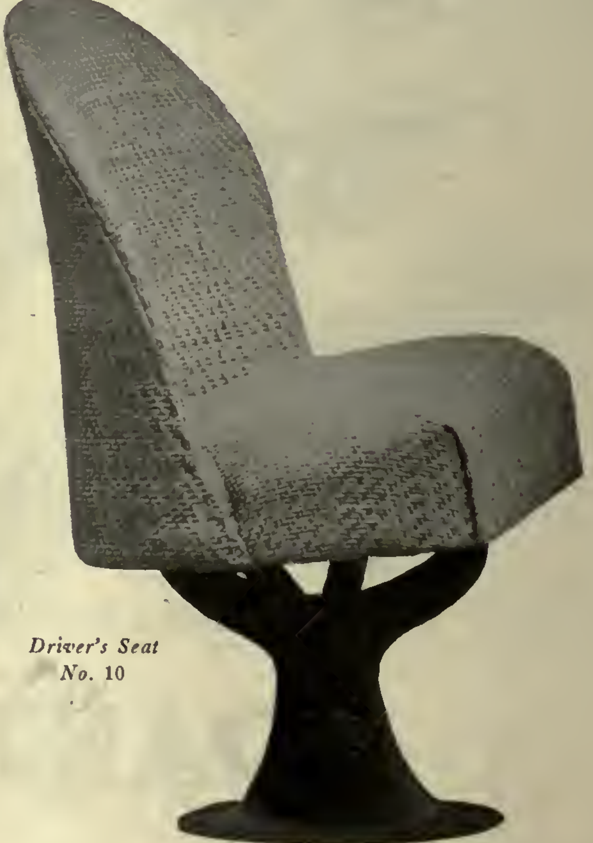
Solves Problem of

Motor Bus Seating

Rattan,
Leather
or other
Covering



Passenger Seat
No. 8-C-3



Driver's Seat
No. 10

Over 90% of the 1920 and 1921 Buses are equipped with specially designed

HEYWOOD-WAKEFIELD SEATS

for

Comfort and Service

Detail Specifications and Photographs on request.

HEYWOOD-WAKEFIELD COMPANY
WAKEFIELD, MASS.

SALES OFFICES:

Heywood-Wakefield Co.,
516 West 34th St.,
New York

Heywood-Wakefield Co.,
1415 Michigan Ave.,
Chicago

E. F. Boyle,
Monadnock Bldg.,
San Francisco, Cal.

F. N. Grigg,
630 Louisiana Ave.,
Washington, D. C.

Railway and Power Engineering Corp.
Toronto and Montreal

G. F. Cotter Supply Co.,
Houston, Texas

SHOP AND POWER PLANT EQUIPMENT

Advertisers In This Section

Allis-Chalmers Mfg. Co.
Anchor Webbing Co.
Automatic Reclosing Circuit Breaker Co.

Babcock & Wilcox Co.
Belden Mfg. Co.
Buckeye Jack Mfg. Co.

Cameron Electrical Mfg. Co.
Clark Management Corp., E. W.
Columbia Machine Works & Malleable Iron Co.
Comstock Mfg. Co.
Continental Fibre Co.
Cutter Co.

Dolph Co., J. C.
Dossert & Co.
Duff Mfg. Co.

Ford Chain Block Co.

Galena-Signal Oil Co.
Gladium Co., Inc.

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India Alkali Works
Ingersoll-Rand Co.
Irvington Varnish & Insulator Co.

Kinnear Mfg. Co., The

Mica Insulator Co.

National Carbon Co., Inc.
National Metal Molding Co.
Niles-Bement-Pond Co.

Portable Machinery Co.
Post & Co., Inc., E. L.
Power Specialty Co.

Scaife & Sons Co., Wm. B.
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Standard Underground Cable Co.

Texas Co., The
Terry Steam Turbine Co.
Thompson-Levering Co.
Tubular Woven Fabric Co.

Universal Lubricating Co.

Williams & Co., J. H.

Tried Designs Insured Satisfactory and Prompt Results

This plant, capacity 31,250 kv-a., was put into regular operation seven months after first excavation was made. It is a remarkably efficient plant, built of the best material and equipment. It is equal to all emergencies. The cost per kilowatt was remarkably low, yet the design allows for low operating costs.

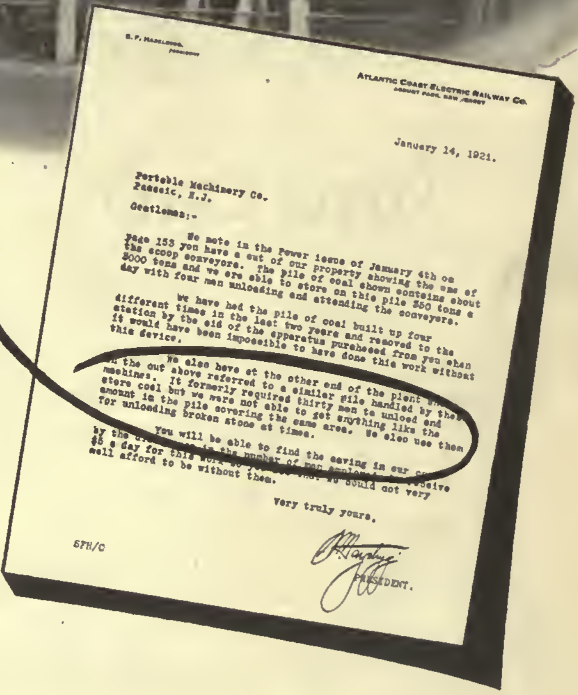
We believe the one function of the power plant is to supply electrical energy at the lowest possible cost. No equipment should be provided, no building or architectural expense involved which does not work to this one end. There is no excuse for reduction in the quality of plant equipment—but savings in the amount of piping required and other parts of like nature are not only justified but demanded in order to secure a minimum-cost per kw. More indicating and recording instruments must be provided, stokers installed and steam-driven auxiliaries supplanted by motor driven.

In this connection we offer our experience and our services in the design and construction of UNIT POWER PLANTS—a design that may be built in units or sections, each section complete in itself and able to render efficient, reliable, lowest cost service with minimum investment. The first cost will vary approximately directly with the installed capacity, but the cost of generating current—and this is the essential consideration—will reach the lowest possible level.

Without obligation or cost on your part, we would be glad to make preliminary recommendations on your problems. Write for Booklet A.

E. W. Clark & Co. Management Corporation
Columbus, Ohio

Management, Engineering and Construction of Railway, Lighing and Power Properties.



ATLANTIC COAST ELECTRIC RAILWAY CO.
ASBURY PARK, NEW JERSEY

January 14, 1921.

Portable Machinery Co.
Passaic, N.J.

Gentlemen:-

We note in the Power issue of January 4th on page 153 you have a cut of our property showing the use of the scoop conveyors. The pile of coal shown contains about 5000 tons and we are able to store on this pile 350 tons a day with four men unloading and attending the conveyors.

We have had the pile of coal built up four different times in the last two years and removed to the station by the aid of the apparatus purchased from you when it would have been impossible to have done this work without this device.

We also have at the other end of the plant [illegible] the cut above referred to a similar pile handled by these machines. It formerly required thirty men to unload and store coal but we were not able to get anything like the amount in the pile covering the same area. We also use them for unloading broken stone at times.

You will be able to find the saving in our [illegible] by the [illegible] in the number of men employed [illegible] receive $5 a day for this work [illegible] we could not very well afford to be without them.

Very truly yours,

PRESIDENT.

SFH/C

formerly required thirty men

THE Atlantic Coast Electric R.R. Co. have efficiently solved their coal handling problem—read their letter—4 men in place of 30. Consider what this would mean to you.

And not only that, the cost of the installation is but a fraction of the cost of a more elaborate but less capable conveying system.

And the same machines can be used for reclaiming, for unloading cars, for loading trucks or for handling a variety of loose material any place about the plant.

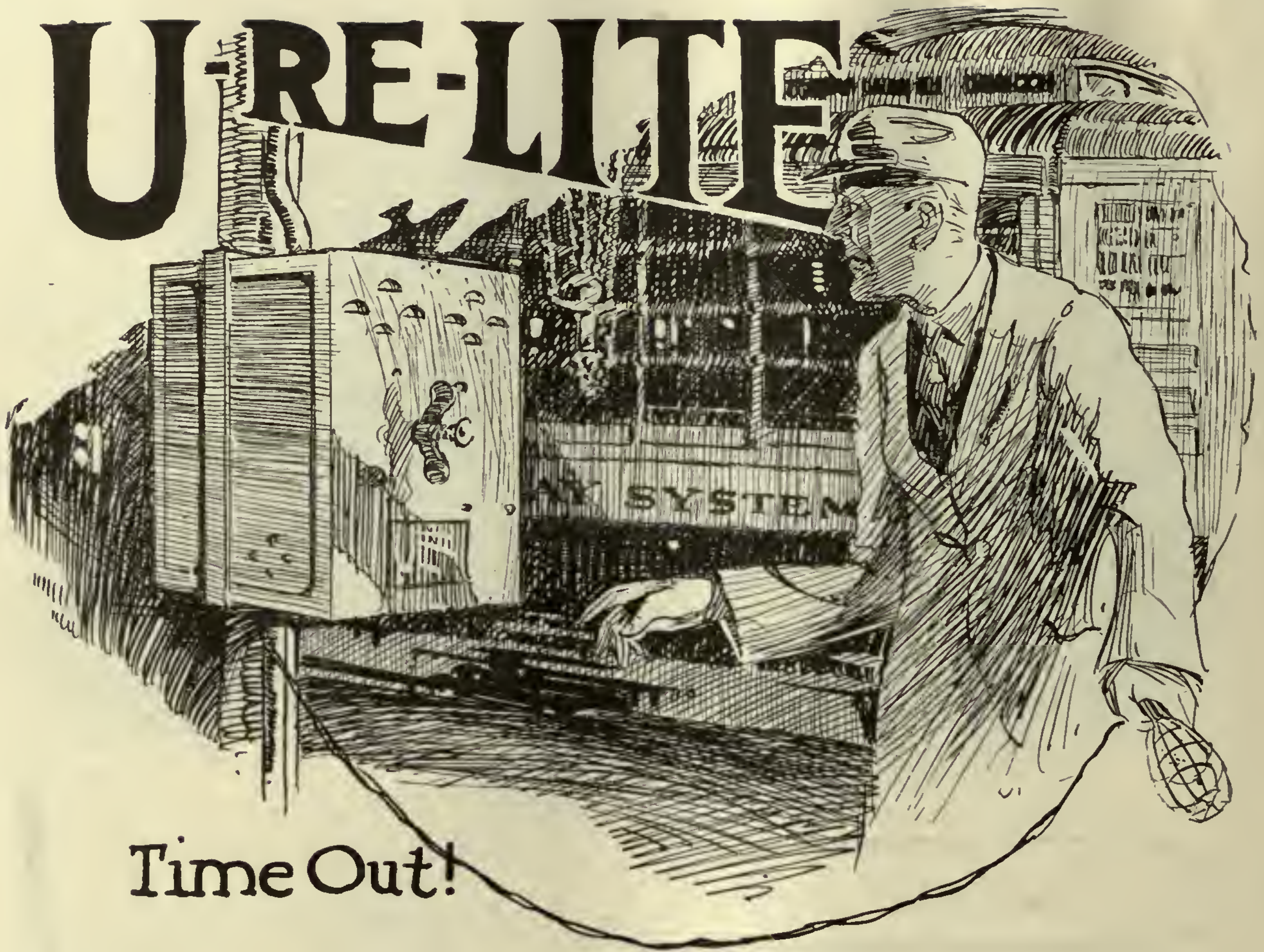
You have coal to handle or will have some soon—write for our Catalog No. 57.

PORTABLE MACHINERY CO.
PASSAIC, N. J.

ask any user
PORTABLE MACHINERY CO. PASSAIC, N.J.

THE SCOOP CONVEYOR

U-RE-LITE



Time Out!

The hum of motors and tools suddenly ceases; men straighten up from their work and prepare to take a little rest or have a smoke while some other fellow goes hunting for the blown fuse and then searches for a new one to replace it. Perhaps, too, the shop lights are out.

How much actual money will these minutes idle time of men and machinery cost?

U-re-lite, a combined switch and circuit breaker, which eliminates all fuses, absolutely protects your circuits from overloaded motors and "shorts" and *is ready for instant re-closing of the circuit* without loss of time.

Then U-Re-Lite 100% Saving on Fuse Expense Looks Big—But

that's less than half the story. It's the elimination of lost time in the shop that figures into big money!

U-re-lite is made in various sizes and capacities up to 200 amperes for both A.C. and D.C. circuits. Adjustable over a wide range both above and below the actual rating as shown on the name plate.

if it isn't
an I-T-E
it isn't a
U-RE-LITE

First to the left—and then to the right
Turn the handle—and U-re-lite

Send for Booklets

The Cutter Company
Established in 1888
Philadelphia, Pa.

Aladdin Up-to-Date

The Magic Lamp of REHABILITATION

When Aladdin rubbed his magic lamp—says that fascinating old tale of the Arabian Nights—there appeared, ready to obey, an all-powerful Genie, the Oriental conception of unlimited service. And Aladdin, wise in his generation—first chose to use his new found servant to rehabilitate himself with food and raiment, that he might more easily accomplish his other desires.

Even as Aladdin's wise first choice was for food and raiment, so also is the wisdom of the electric railway that first of all chooses to rehabilitate its rolling stock;—because efficient car operation, possible only with efficient cars, is the very food and raiment of the electric railway business.

Ready to serve, as was the mythical Genie, stands the Columbia organization, almost as all-powerful as he, in ability to meet demands for electric railway equipment to make *new cars of old*, to the end that selling transportation may become more profitable.

Columbia's ability to serve is indicated on the pages that follow.

Columbia Machine Works & Malleable Iron Co.
Atlantic Ave. & Chestnut St., Brooklyn, New York

New Cars

By Rehabilitating

TRUCKS and BRAKE RIGGING

The condition of trucks and brake riggings is the very foundation on which rests the safety and comfort of passengers. If these vital parts are run-down, weakened or generally inefficient, car service cannot be satisfactory or profitable. Begin at the bottom—Rehabilitate trucks and brakes!

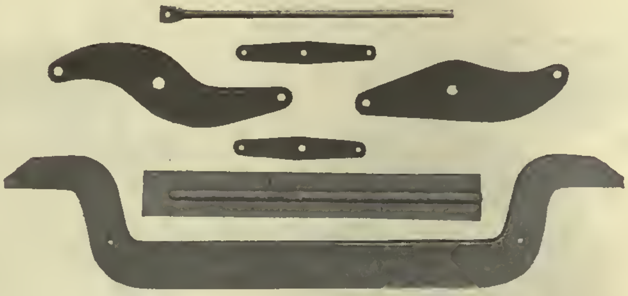
COLUMBIA

Journal Bearings

Columbia bearings have earned a deservedly fine reputation in the electric railway field. They are especially noted for their accuracy of fit—perfect halves obtained by our special method of splitting.

Brake Rigging

Skilled workmen, modern machines and our electric railway experience enable Columbia Service to produce dependable brake levers, jaws, equalizer bars, pins and other pieces of this most important part of car equipment.



Any Parts You Want

These are only a few of almost innumerable parts which we are prepared to make to your order.

Write us for quotations on whatever you need.

Brake Pins Gusset Plates
Third Rail Shoes
Turnbuckles
Bolts

The Columbia Machine Works

Atlantic Ave. and Chestnut

A. A. Green, Sales Mgr.,
Brooklyn, N. Y.

E. Keller,
Brooklyn, N. Y.

F. C. Hedley,
Brooklyn, N. Y.

J. L. Whittaker,
141 Milk St.,
Boston, Mass.

for Old

By Rehabilitating

MOTORS

Coils with broken-down insulation, arcing commutators and worn-out bearings, all waste costly electric power which should be doing useful work. Cut out the waste resulting from inefficient equipment.

COLUMBIA

Coils

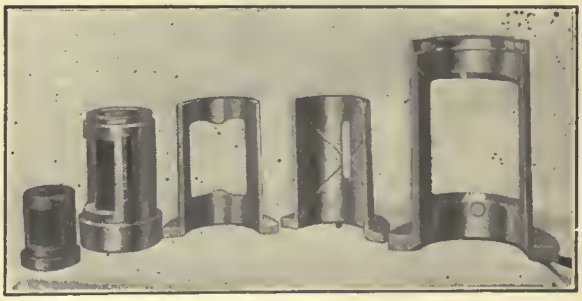
Columbia coils are made for every standard type of railway motor field and armature. Specially shaped and insulated ones if specified. Only the finest insulating materials are used. Put pep into old motors with new Columbia made coils.

Gear Cases

Columbia sheet steel gear cases have a channel-shaped suspension especially reinforced by three thicknesses of metal where the weight comes. You will not have a repair-job of welding at this point, on Columbia gear cases.

Motor Bearings

Poor motor bearings mean lost motion, jerky running and wasteful friction. New Columbia bearings made of pure metals, properly alloyed are uniformly smooth and long-wearing. Absolutely interchangeable halves simplify maintenance problems.



Armature Shafts Brush-Holders
Commutators Bolts Coils
Motor Covers Thrust Collars
Motor Suspension Bars

and Malleable Iron Company
Street, Brooklyn, N. Y.

E. Allison Thornwell,
1513 Candler Bldg.,
Atlanta, Ga.

W. McK. White,
343 South Dearborn St.,
Chicago, Ill.

F. F. Bodler,
903 Monadnock Bldg.,
San Francisco, Cal.

Railway & Power Eng. Corp.
133 Eastern Ave.,
Toronto, Ont.

New Cars

By Rehabilitating

CONTROLLERS

Controllers must operate with firm, clean-cut contacts and contact breaks. Jerky acceleration of cars, and arcing, smoking controllers are a source of annoyance, discomfort and possible danger to passengers. Such things nullify the best attempts of other departments to increase sales of transportation.

COLUMBIA

Cylinder Shafts
Contact Segments
Contact Fingers and Tips
Controller Handles
Grid Resistors

Years of experience have established our capacity to furnish these parts, turned to fit accurately in any specified type of controller. Based on virgin pure copper, correctly mixed with suitable alloys for necessary hardness, all contact parts have maximum conductivity combined with long life.

Parts for All Types of G. E. and W. H. Controllers

Our range of supplies is not limited to these few items enumerated. Our unequalled shop facilities permit production of any special castings or finished work for electric service. Estimates will be made from your blue-prints and specifications and promptly returned to you without obligation on your part.

The Columbia Machine Works

Atlantic Ave. and Chestnut

A. A. Green, Sales Mgr.,
Brooklyn, N. Y.

E. Keller,
Brooklyn, N. Y.

F. C. Hedley,
Brooklyn, N. Y.

J. L. Whittaker,
141 Milk St.,
Boston, Mass.

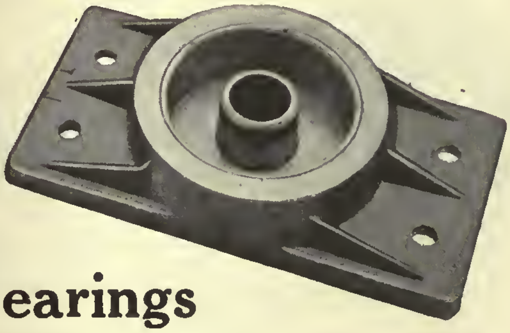
for Old

By Rehabilitating

CAR BODIES

A car body is too valuable to send to the scrap heap these days. A thorough over-hauling, painting and replacement of worn-out or obsolete parts will work wonders. Many companies are putting out rebuilt cars which look and operate like new.

COLUMBIA



Center Bearings

Unless new smooth center bearings are provided, much of the rehabilitation work will be in vain—at least as far as more comfortable riding is concerned. New ones will eliminate those rough jerks in stopping and starting, when worn-out center pins take up lost motion in the bearing. Columbia center bearings are made of specially-hardened, long-wearing steel.

Door Levers and Mechanisms

Replace dangerous open-entrances, or old fashioned doors, with safe, light, easily operated folding doors and steps. Columbia organization will help you to design and construct your own door operating mechanisms at lowest ccst.

Seat Hardware

The longitudinal seat and hang-strap are most unpopular. Construct cross seats, with convenient grab-handles on ends. Columbia can make any special castings, levers, and fixtures for mounting and operating cross seats.

Destination Signs Register Pulleys Register Rods
Fare Box Brackets Bells and Gongs

Get our quotations on all special Metal Fixtures wanted

and Malleable Iron Company

Street, Brooklyn, N. Y.

E. Allison Thornwell,
1513 Candler Bldg.,
Atlanta, Ga.

W. McK. White,
343 South Dearborn St.,
Chicago, Ill.

F. F. Bodler,
903 Monadnock Bldg.,
San Francisco, Cal.

Railway & Power Eng. Corp.
133 Eastern Ave.,
Toronto, Ont.

New Cars

By Rehabilitating

TROLLEYS

Irregularly worn trolley wheels, crooked poles, and poorly maintained overhead lines, cause that miserable condition of frequent "trolley-off" delays. Old wheels are often noisy—and decrepit poles unsightly. You can't give snappy car service with such equipment.

COLUMBIA

Poles
Harps
Wheels

In stock—poles 11 to 15 feet, special sizes on request.

In Columbia trolley harps and wheels, correct lubrication is provided for—they will reduce maintenance costs to a minimum. We have been making trolley wheels for about a quarter of a century, and have learned how to shape them so they will cling to the wire. Sizes $4\frac{1}{4}$, 5 and 6 inches in stock.

This is the time to think of laying in a stock of Columbia special Sleet Cutting Wheels. They clear the wire without any additional attachments. Don't wait until the snow flies, and then have to telegraph for them.

Line Material Also

Our trolley, splicing, and feeder ears have the same consistent Columbia Quality that makes for satisfactory service and operating economy.

Send your inquiries in now!

The Columbia Machine Works

Atlantic Ave. and Chestnut

A. A. Green, Sales Mgr.,
Brooklyn, N. Y.

E. Keller,
Brooklyn, N. Y.

F. C. Hedley,
Brooklyn, N. Y.

J. L. Whittaker,
141 Milk St.,
Boston, Mass.

for Old

By Rehabilitating

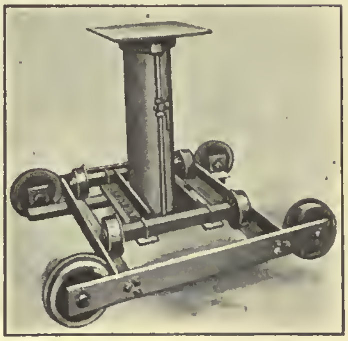
SHOP MACHINERY

Nothing so strongly tends to keep cars in the "pink of condition" as modern efficient machines for heavy work around the shops. Rehabilitation of cars can be accomplished at minimum cost only when labor saving equipment is used.

COLUMBIA

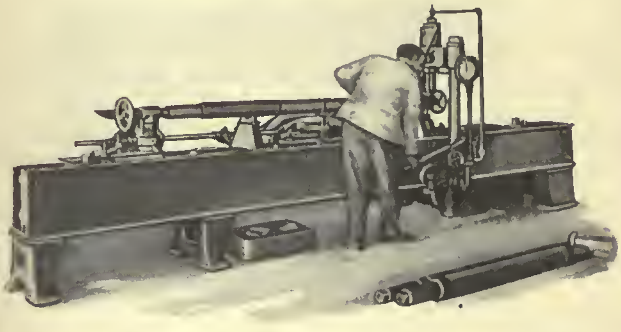
Car Hoists and Pit Jacks

The Columbia Car Hoist will lift a 50-ton car 6 feet in 5 minutes. Of special sturdy construction —it will not sway. At the right is one of our 2-ton pneumatic pit jacks. Both are indispensable in any busy, efficiently operated car shop.



Axle Straightener

Handles axles or any other shafts up to 6 inch diameter. Operated hydraulically. This photograph was taken in the Third Avenue Railway Shops, New York City.



Armature Buggies
Babbitting Moulds
Bearing Boring Machines

Car Replacers
Pinion Pullers
Tension Stands

and Malleable Iron Company

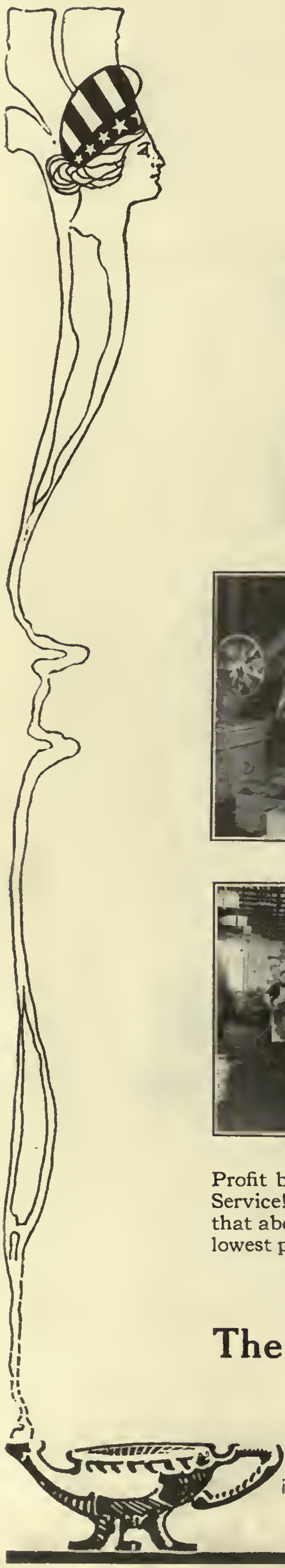
Street, Brooklyn, N. Y.

E. Allison Thornwell,
1513 Candler Bldg.,
Atlanta, Ga.

W. McK. White,
343 South Dearborn St.,
Chicago, Ill.

F. F. Bodler,
903 Monadnock Bldg.,
San Francisco, Cal.

Railway & Power Eng. Corp.
133 Eastern Ave.,
Toronto, Ont.



New Cars for Old

By Rehabilitating

SPECIALTIES OF ALL KINDS

Local conditions and individual ideas have brought into being a demand for many special parts considered necessary or desirable in each individual case. Whether for the cars, the shops, or for the power plant, Columbia is prepared to produce them at lowest cost.

COLUMBIA

Castings and Forgings

Aluminum—Brass—Bronze—Cast Steel Grey Iron—Malleable Iron—White Metal Zinc

Columbia's pattern shop and foundry are completely equipped with the most modern and efficient machinery. We pride ourselves on our ability to supply the most complicated castings and foundry work exactly to your own blue prints. Our castings are of uniform homogeneous metal, and are produced at lower cost than you can get them from your own or local shops.

Machine Work

Accuracy is our principal asset. When you send us your blue prints for any piece of machine shop work—depend upon it, the parts will fit when they are received for assembly.

Our Parting Shot

Profit by the experience of Aladdin and the magic lamp—Rehabilitate by using Columbia Service! When you're making new cars of old, or seeking anything at all in metal, remember, that about 90% of our output is for electric railway service, and mass production makes for lowest possible costs. Get our quotations in every case.

"Yours truly for service"

The Columbia Machine Works & Malleable Iron Co.

Atlantic Ave. and Chestnut St., Brooklyn, N. Y.

A. A. Green, Sales Mgr.,
Brooklyn, N. Y.
E. Keller,
Brooklyn, N. Y.
F. C. Hedley,
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343 South Dearborn Street,
Chicago, Ill.
F. F. Bodler,
903 Monadnock Bldg.,
San Francisco, Cal.

Railway & Power Eng. Corporation, 133 Eastern Ave., Toronto, Ont.

The Simplicity of the lubrication problem

IN the final analysis, the "lubricating problem" resolves itself into the determining of but one question: "What lubricant will give best results on my property at a minimum cost?"

If you have not yet found that lubricant—if you are not fully satisfied that you are getting maximum results at a minimum cost—if there is any question in your mind about the lubricant you are using being the *very best available* for the purpose—the least you can do is to investigate Tulc. You owe that much to your company and to yourself.

Remember, all our claims are borne out by actual *results attained* on the most progressive Electric Railways in the country. Why not write today for complete data without cost or obligation?

"Overall Specialists"

The service men who work with you on your lubricating problems are not "experts on theories." They put on overalls and get right down to brass tacks—pack your cars—show you how and why Tulc should be used. They get results—real money saving results—99 times out of a hundred. The hundredth time there is no charge for the service.

***The* Universal Lubricating Co.**

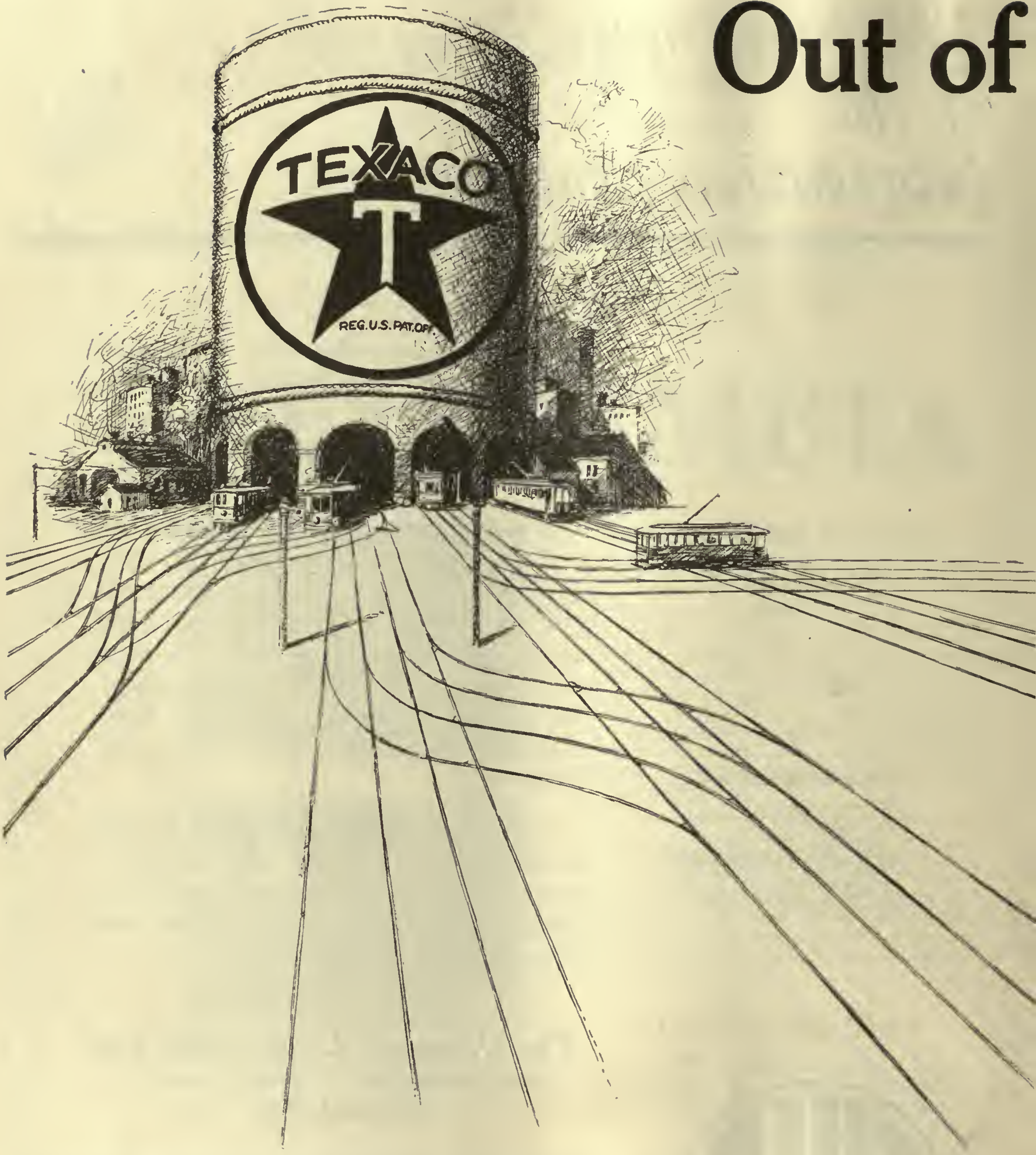
Offices: Schofield Bldg. Works: Sweeney Ave.

Cleveland, Ohio

TULC
A
LUBRICANT

scientifically and accurately compounded to reduce lubricating costs

Out of



TEXACO SERVICE

Comes Smooth Performance—

Because of the nature of their service, electric railways require not only the right oil, but prompt delivery and scientific application.

Texaco Service—"the right oil for the right place at the time you need it"—is your safeguard against the hundred and one maintenance difficulties caused by inefficient lubrication.

Our broad resources of crudes enable us to manufacture the very best lubricant for each especial need. Our 600 delivery stations, 600 warehouses, 5,000 tank cars and huge fleets of auto trucks, comprise a delivery system which can reach you anywhere, any time. Texaco Lubrication-Engineer service is a vital chapter in efficient street railway maintenance.

Now is the time to seek the best lubrication service you can find, as a substantial protection against burned bearings, excess maintenance and power charges, and costly traffic delay.

***Remember*—there is a Texaco Lubricant for every purpose.**

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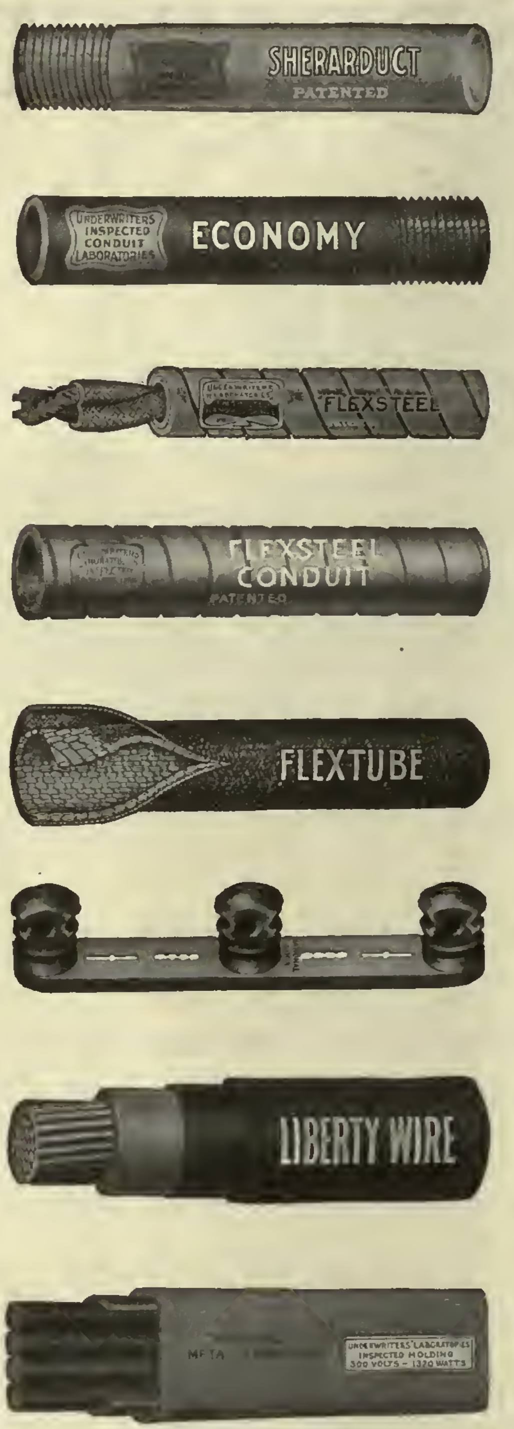
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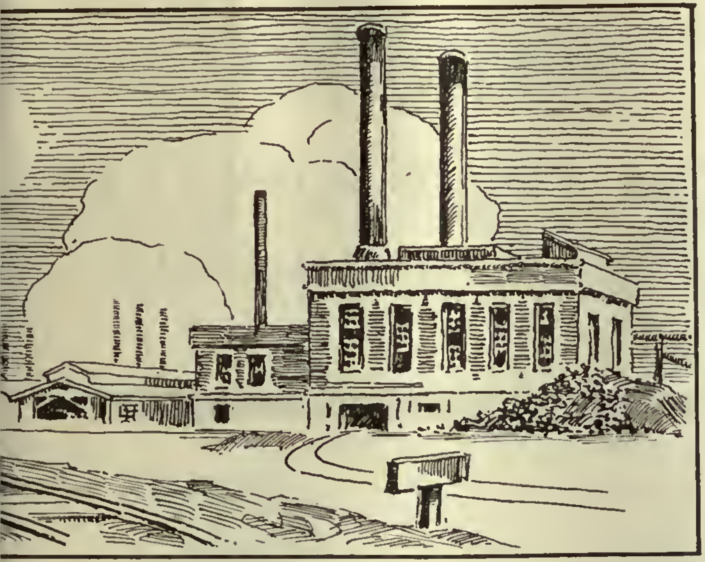

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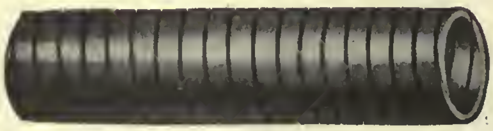

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Electric Railway Equipment

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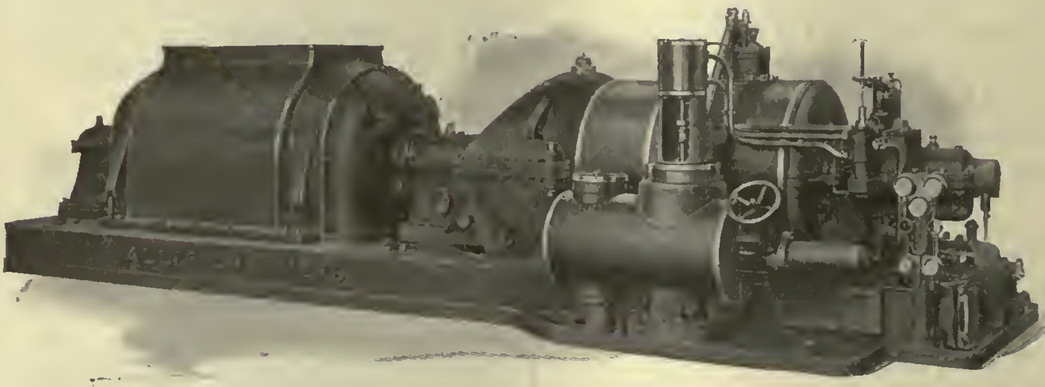
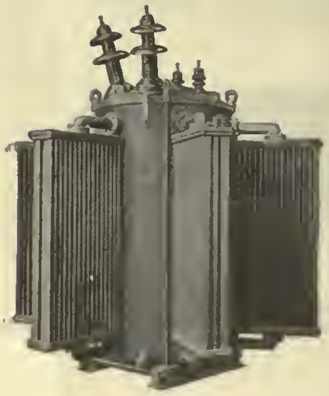
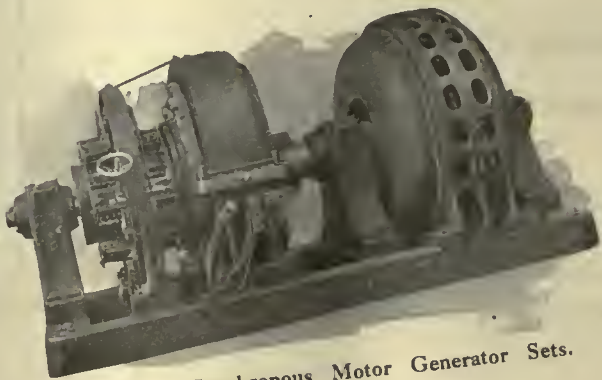


Steam Turbine Units



Power Transformers



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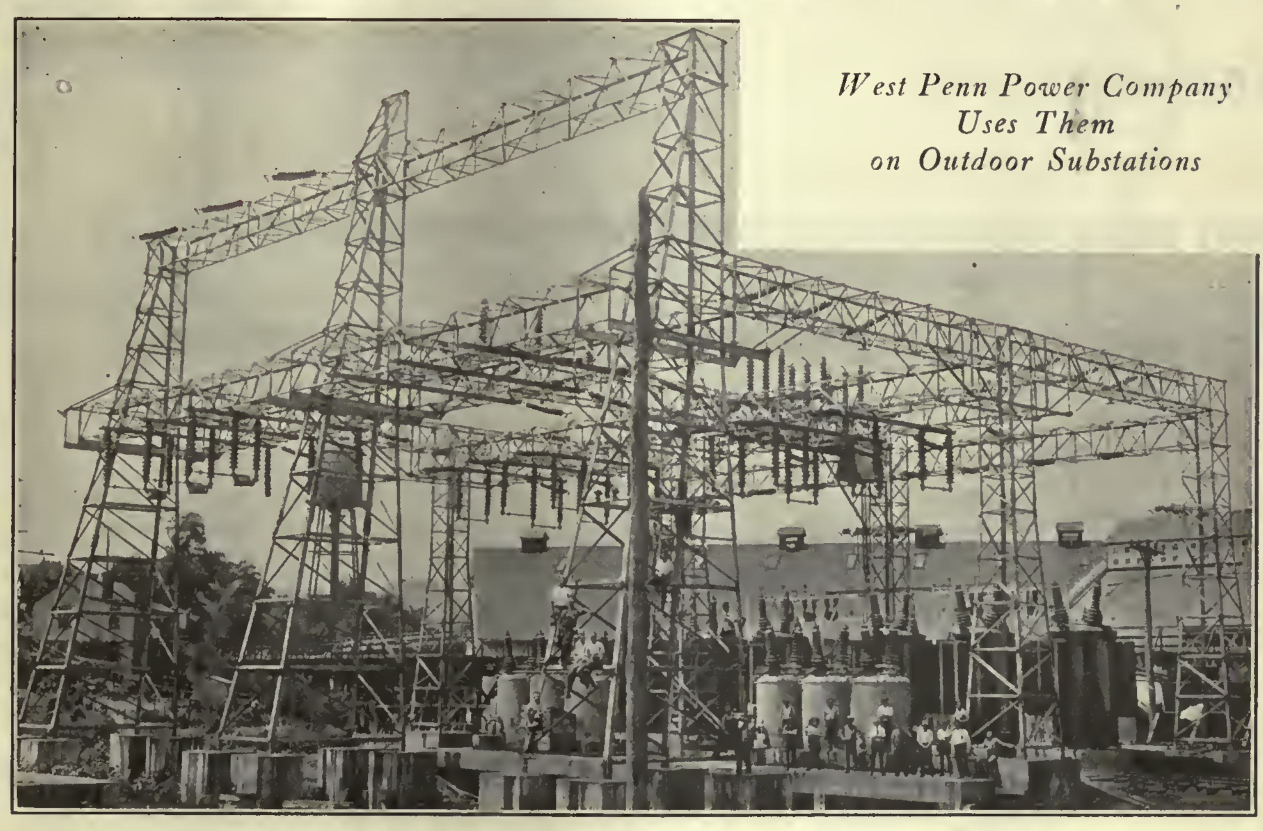

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Service Must Be Reliable!

This requires positive, unfailing connectors in every electric circuit; in other words,

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For your outdoor substations, as well as feeder connections along the lines, for wiring in power plants, substations, and underneath the cars no soldered joint or other form can offer the dependability, economy in installation and efficiency in service which are so distinctly Dossert characteristics.

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DOSSERT & COMPANY

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SAFETY in NUMBERS

250
Total number of reaction turbines installed in Europe prior to the war (See clipping below).

264
Total number of Terry turbines turned out in one month from October 1 to November 1, 1918.

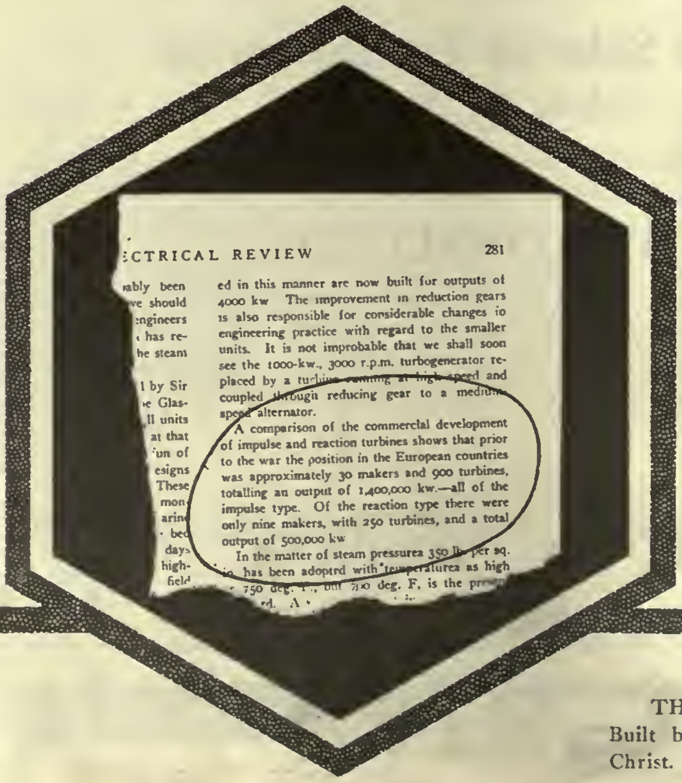
900
Total number of impulse turbines installed in Europe prior to the war.

1000
Total number of Terry turbines turned out in the year 1920.

The Above Figures

were taken from an article entitled: "Steam Turbine Progress in England," which appeared in a recent issue of the Electrical Review (see clipping below). They reveal the surprising fact that prior to the war there were about six times more Terry turbines in existence than all European makes combined.

All turbines may be classified as of the impulse or reaction type, or a combination of both types, the classifications taking their names from the manner in which the energy of the steam is utilized.



ECTRICAL REVIEW 281

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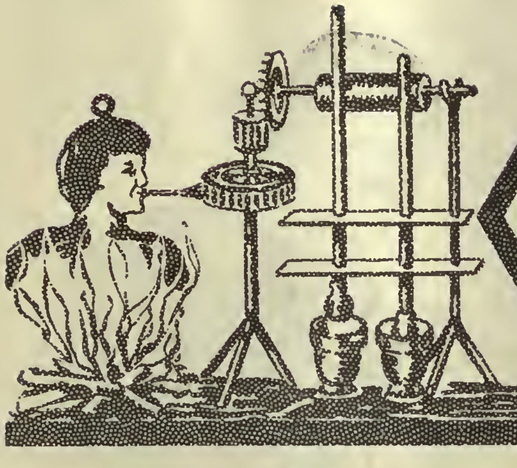
ed in this manner are now built for outputs of 4000 kw The improvement in reduction gears is also responsible for considerable changes in engineering practice with regard to the smaller units. It is not improbable that we shall soon see the 1000-kw., 3000 r.p.m. turbogenerator replaced by a turbine running at high speed and coupled through reducing gear to a medium speed alternator.

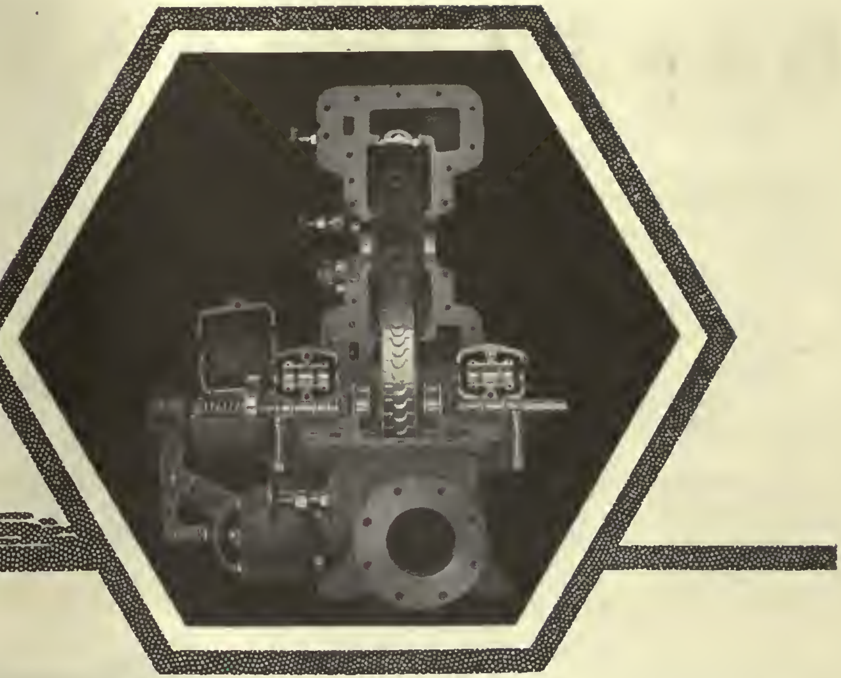
A comparison of the commercial development of impulse and reaction turbines shows that prior to the war the position in the European countries was approximately 30 makers and 900 turbines, totalling an output of 1,400,000 kw.—all of the impulse type. Of the reaction type there were only nine makers, with 250 turbines, and a total output of 500,000 kw

In the matter of steam pressures 350 lb. per sq. in. has been adopted with temperatures as high 750 deg. F., but 700 deg. F. is the pres

THE FIRST REACTION TURBINE
Built by Hero in the second century before Christ.



THE FIRST IMPULSE TURBINE
Built by Branca in the year 1629, A. D.



Referring to the first reaction and impulse turbines built, the manner in which the energy is utilized can be seen at a glance. The rotating effort of the globe in Hero's turbine is produced by the reaction of the steam issuing at high velocity from the rotating element, while in Branca's turbine of the impulse type, steam issues at high velocity from a stationary member and impinges against the rotating element.

This comparison in numbers of turbines per month or year bears no reference to the size of the units compared because the majority of Terry turbines are for auxiliary drive with small capacities, but, in spite of this fact, the total capacity of all Terry turbines in operation is about 20 per cent greater than the total capacity of reaction type turbines installed in Europe.

Because of this vast number of Terrys now installed, the buyer of a Terry turbine today is assured three things. First, that the Terry has through experience reached a state of high engineering perfection. Second, that his judgment is endorsed by a large majority of turbine buyers, and last, which is obvious, that there could not be so many Terrys in operation if buyers had not found complete satisfaction in

T-752

THE TERRY TURBINE

Offices in Principal Cities
in U.S.A. also in Important
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Now is the time to put your electrical equipment in good shape for the winter. Right now low insulation prices enable you to do needed repair work at a small cost.

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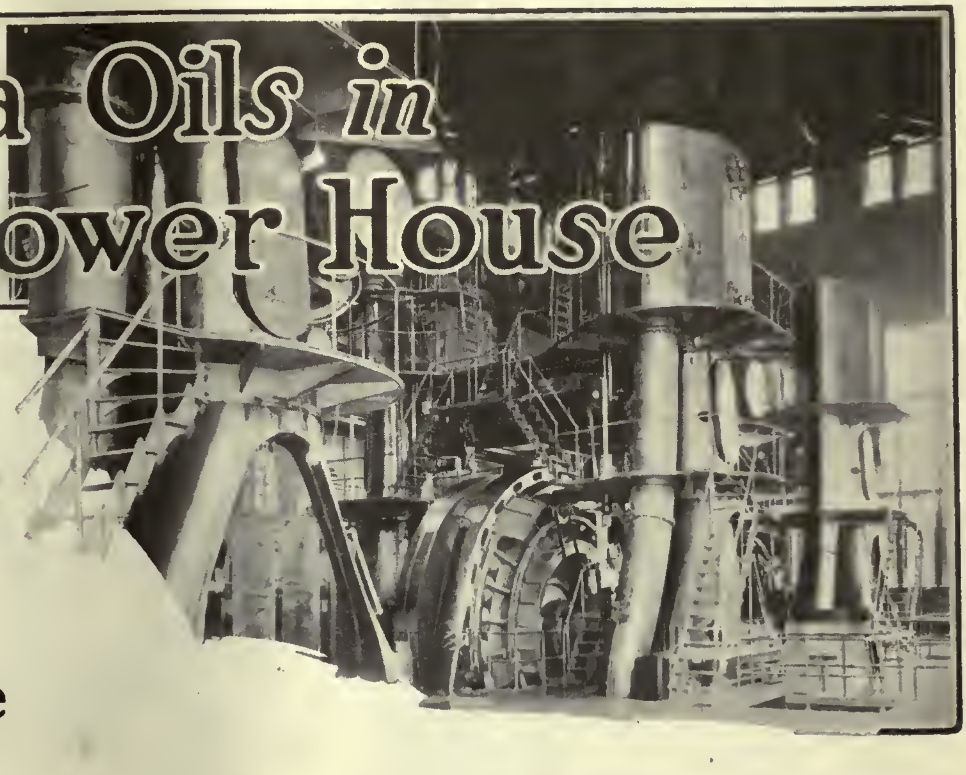

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On the powerful turbines, reciprocating engines and other machinery of the power house Galena Oils demonstrate the superior lubricating efficiency of quality products.

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are oils made by Galena process from the finest stocks obtainable, built with the care and precision that insures uniformity. In hundreds of power houses they are delivering exceptional service and demonstrating their economy by their longer life and body-holding properties.

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is the heritage of over fifty years of experience in the development and improvement of railway equipment lubrication, a business that this company has, through specialization, reduced to a science.

It is our absolute and unwavering confidence in Galena Quality that enables us to *guarantee* the delivery of stated service from these oils, by written contract—a condition that manufacturers of the lower grade products have found by experience they are unable to meet.

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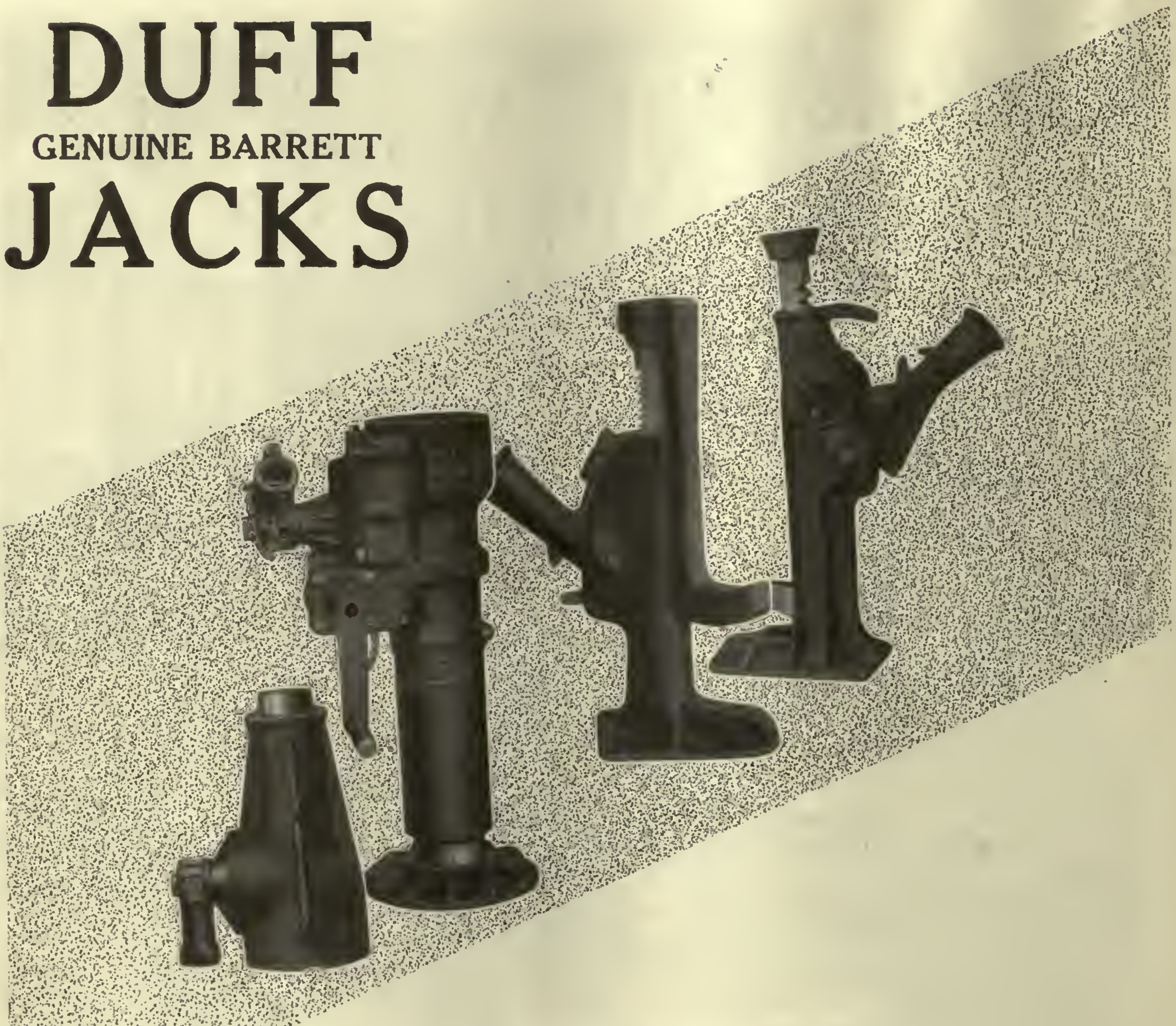
DUFF
GENUINE BARRETT
JACKS



Any Lift is Easy For a DUFF Jack

Duff Jacks for Electric Railways are members of a nationally-known family which embraces high-quality Jacks for every form of lifting service. The Duff makers are Jack specialists—have been for many years. Wherever there is a lift, there is a Duff that is best for it.

The special standards of strength, simplicity, ease of operation, and long life—made possible by this complete knowledge of Jack manufacture, distinguish Duff Jacks from all others.

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ELECTRICAL INSULATION

The Mica Insulator Company is the pioneer manufacturer of mica product insulation and oiled or varnished fabrics, paper, tapes, tubes, etc. With years of experience, special machinery, a large modern factory, and a staff of manufacturing and technical experts, it is especially equipped to serve every electrical insulation requirement in the electrical railway field.

MICANITE

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Black varnished cloths and papers.

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Amber colored insulating varnish.

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Micanite insulating cable joints for underground transmission systems.

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Compound for filling cable joints.

MISCELLANEOUS

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"Electrical Insulating Materials" is a catalog that every railway repair shop and purchasing department should have for an insulation guide. How many copies shall we send you?

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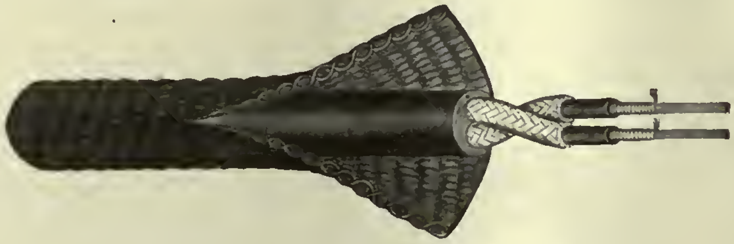

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Strong—Durable—Moisture Proof

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You can call upon us to equip a complete shop unit or to supply a single tool. Our facilities, our experience and our reputation guarantee your satisfaction.

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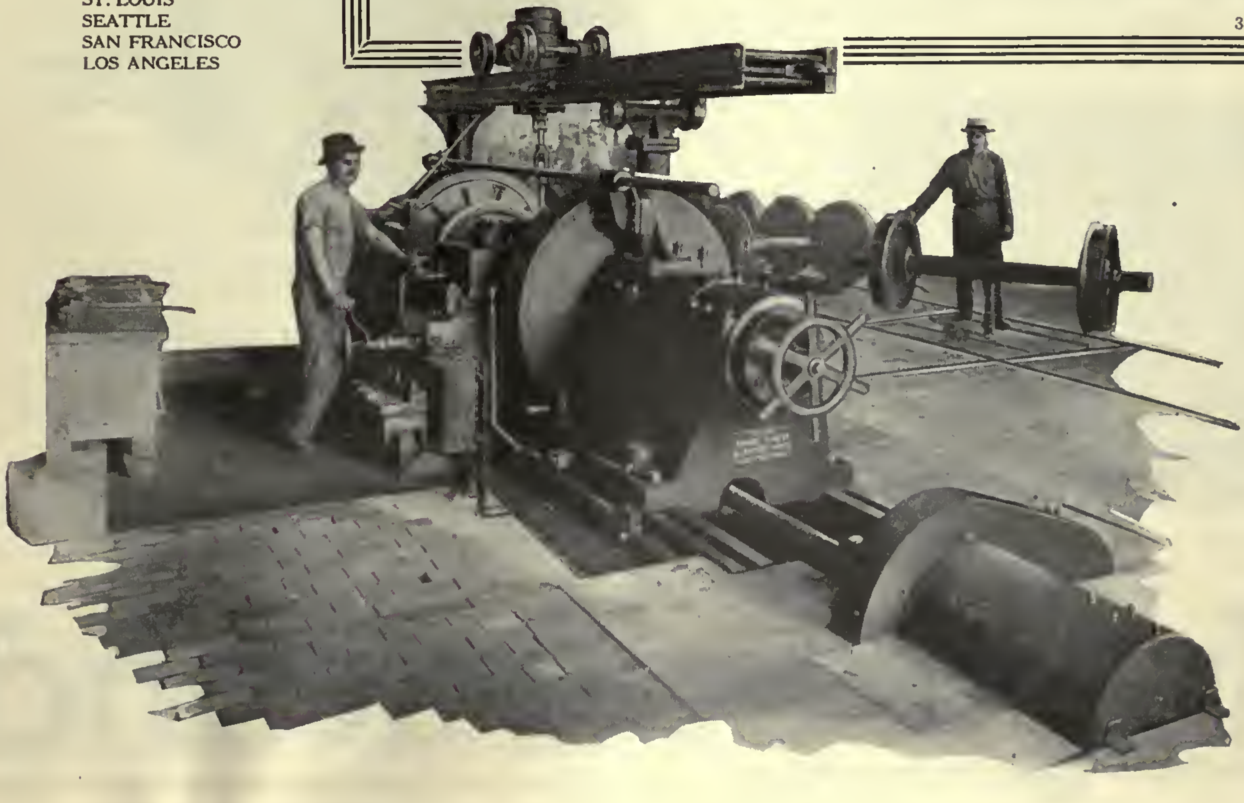
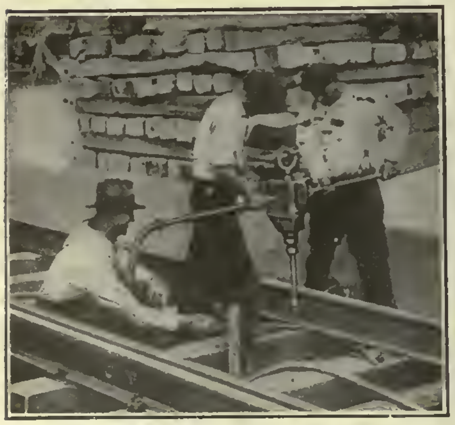


The Imperial Tamper Car is a handy portable compressor for many kinds of work.

Imperial Tampers enable small gangs to equal the work output of large ones.

Paving Breakers operated from the Tamper Car show savings up to 75% over handwork.



Other machines such as the screw spike driver can be used with a Tamper Car to reduce track work costs.

Further Savings in Track Work

Four men with "Imperial" Pneumatic Tamping Tools will tamp more track than 12 to 16 men working with picks and bars, and do a better and more lasting job.

Besides quartering the cost of tamping ties, "Imperial" Outfits make possible the use of labor saving methods on other kinds of work. For instance, in breaking out paving of any character, the Portable Tamper Car supplies air to the pneumatic Paving Breakers, which show savings of 60% to 75% over hand methods.

Other tools used with the outfit are air operated spike drivers, tie borers, track drills, portable grinders, riveting and chipping hammers, etc.

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Put equipment back to work quicker—and that means a more satisfied public

The Comstock Coil Winding Machine

Minimizing the time equipment is out of service, by winding the motor armatures faster when they need repairing, will help to keep running the number of cars adequate to the traffic's needs.

That helps to keep your transportation "sold" to the public.

The Comstock does either right or left hand winding faster because it has a three-speed drive which gives you just the right working speed for the job to be done. Four wheel Veeder counter.

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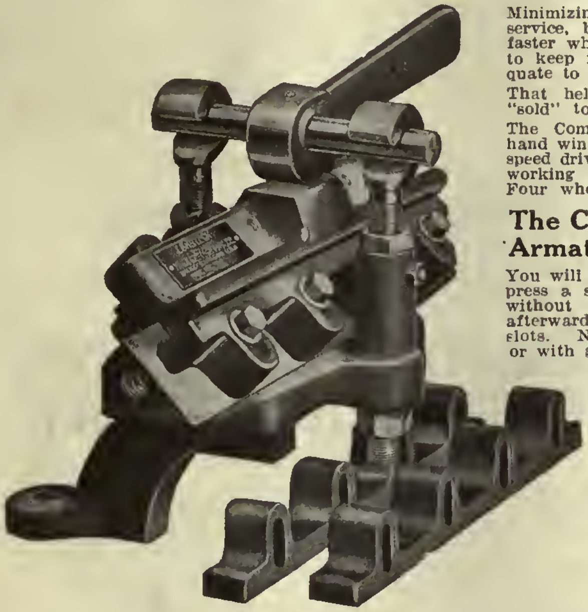
You will find this adjustable armature coil press a speedy help in shaping the coils without breaking the insulation. And afterwards the coils will fit snugly into the slots. No jamming. Press is used cold or with gas or steam for hot pressing.



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MINIMIZE MAINTENANCE Cost with Cameron Products

Cameron Coils—Wound to withstand that rush-hour overload that means a burnout with poorly insulated coils.

Cameron Bars—Pure hard drawn copper, giving high conductivity.

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Canadian Amber—Gives soft, uniform wear and long life.

Cameron Electrical Mfg. Co., Inc.
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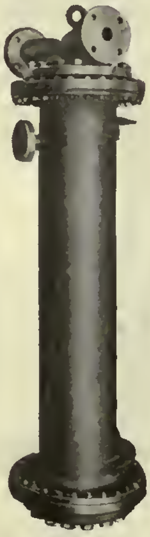
S & K
FUEL OIL HEATERS

Catalog 10-F



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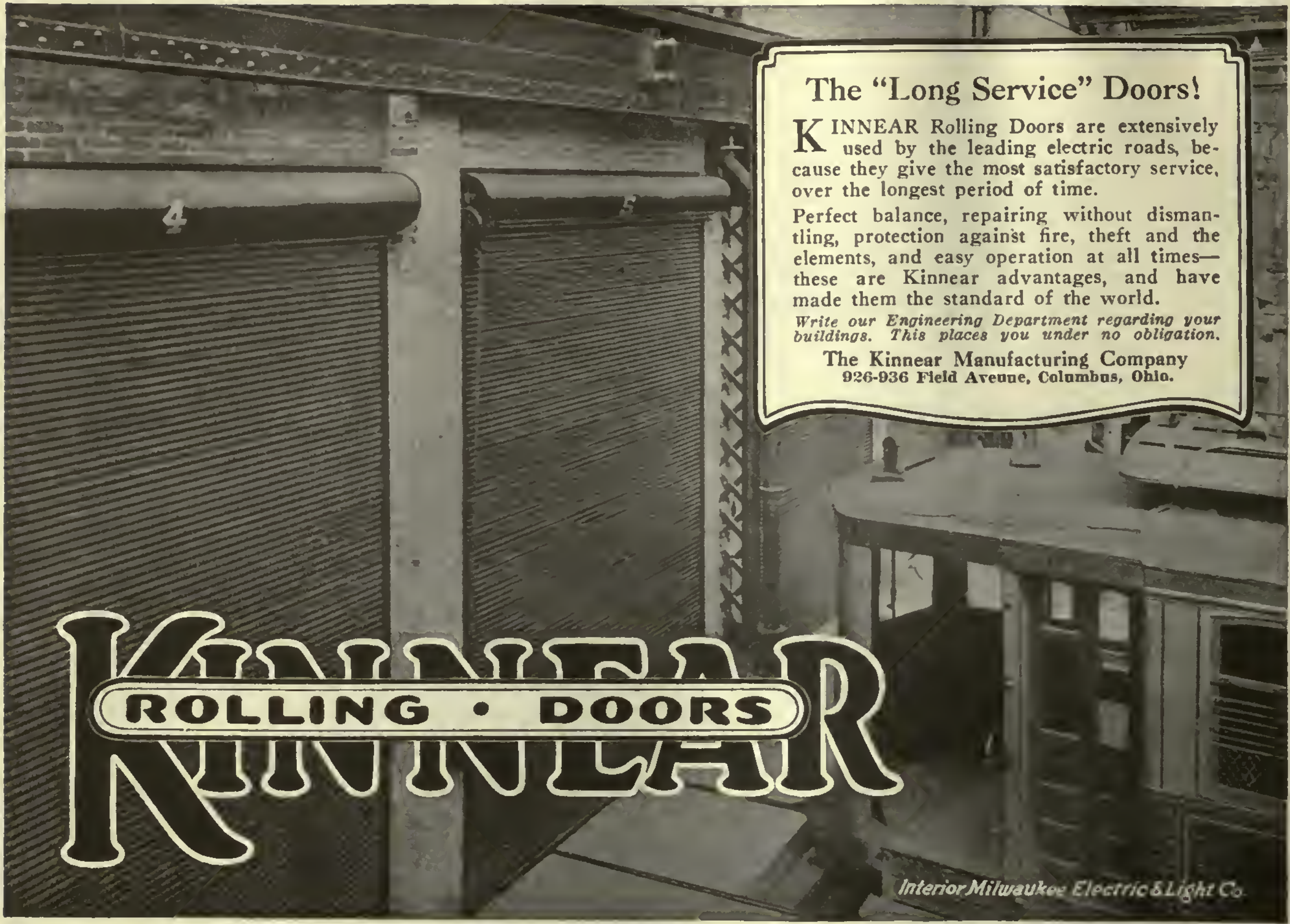

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Perfect balance, repairing without dismantling, protection against fire, theft and the elements, and easy operation at all times—these are Kinnear advantages, and have made them the standard of the world.

Write our Engineering Department regarding your buildings. This places you under no obligation.

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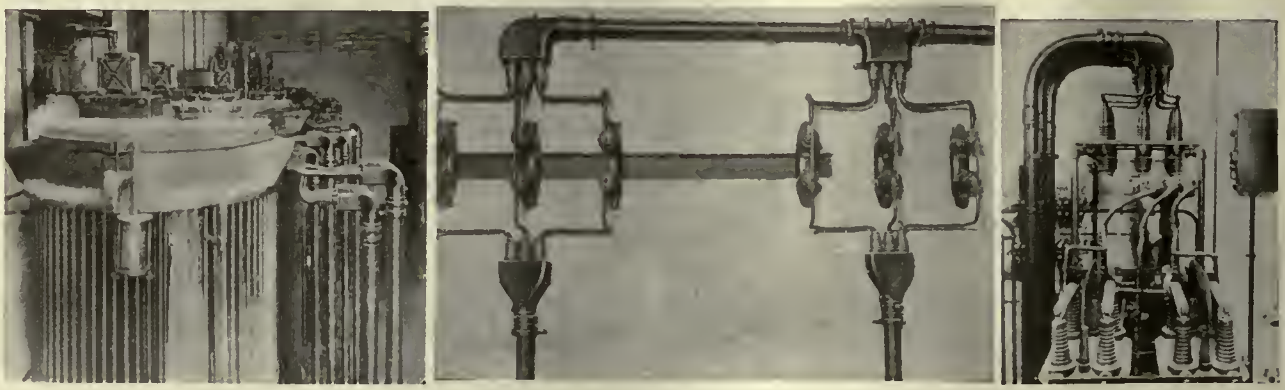

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STANDARD Cable Terminals

Type D. S. (Indoor) Type D. O. A. (Outdoor)

in addition to affording maximum protection to cable insulation both outdoors and indoors, facilitate the convenient and economical installation of such cables. These exclusive and patented features are fully described in Bulletins 710 (indoor type) and 700 (outdoor type). Write our nearest office.

Standard Underground Cable Co.

Boston, New York, Atlanta, Philadelphia, St. Louis, Chicago, Detroit, Seattle, Los Angeles, Minneapolis, San Francisco, Washington, Salt Lake City, Kansas City

General Offices: Pittsburgh, Pa.

For Canada: Standard Underground Cable Co. of Canada, Limited, Hamilton, Ont.

Reduce Commutator Wear and Losses Due to "Tie-Ups"

To be absolutely safeguarded against excessive commutator wear—assured of real mileage day in and day out—and to obtain lower operating costs, use

Columbia Pyramid Brushes

the brushes that were made to suit the commutator and the service.

You name the job—we'll name the brush

National Carbon Company, Inc.
Cleveland, Ohio

MOST Economical **MOST Satisfactory**

SAVOGRAN

The Standard Pure, Soluble Soap Powder In Use for 46 Years

INDIA ALKALI WORKS, Boston, Mass.

Dolph's

Insulating Varnishes and Compounds
For Electric Railways

For Armature Coils
Dolph's Chinalak Clear, Baking. Dolph's Chinalak Black, Baking.
These varnishes are china wood oil base, long in oil, high in insulation, water repelling and oilproof.

For Armatures
Dolph's Electric Lacquer. Dolph's Black Finishing No. 3.
Electric Lacquer is a black alcohol solvent varnish, is oil and waterproof and air dries in half an hour. Black Finishing No. 3 is a benzine solvent varnish, absolutely waterproof and air dries in 30 minutes.

For Field Coils
Dolph's Waterproof Impregnating Compound No. 17 (For use in impregnating apparatus).
Dolph's Chinalak Clear, Baking. Dolph's Chinalak Black, Baking.
All Varnishes and Compounds guaranteed as represented. Manufacturers of Insulating Varnishes exclusively since 1909.

JOHN C. DOLPH COMPANY
The Insulation Specialists
Newark, N. J.
Representatives:
Baker Joslyn Co., San Francisco, Los Angeles, Seattle.
L. L. Fleig & Co., Chicago: 212 W. Austin Ave. Cleveland: Caxton Bldg.
Bills and Beach, Oliver Building, Pittsburgh
Edgar O. Oeters Co., 695 Arch St., Philadelphia

CAR AND TRUCK EQUIPMENT

Advertisers In This Section

Ackley Brake & Supply Corp.
American Abrasive Metals Co.
American Brake Shoe & Fdry. Co.
American Mason Safety Tread Co.
American Railway Supply Co.
American Rattan & Reed Mfg. Co.
American Steel Foundries
Ass'n of Mfrs. of Chilled Car Wheels

Bayonet Trolley Harp Co.
Bemis Car Truck Co.
Bonney-Vehslage Tool Co.
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Cambria Steel Co.
Carnegie Steel Co.
Chillingworth Mfg. Co
Cleveland Fare Box Co.
Consolidated Car Fender Co.
Consolidated Car Heating Co.
Cooper Heater Co.

Differential Steel Car Co.

Earll, Chas. I.
Eclipse Railway Supply Co.
Electric Service Supplies Co.
Electric Storage Battery Co.
Eureka Co.

Fort Pitt Spring & Mfg. Co.

Globe Ticket Co.
Gold Car Heating & Lighting Co.
Gould Coupler Co.
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Hale & Kilburn Corp.
Hamilton & Hansell
Horne Mfg. Co.
Hubbard & Co.

International Register Co., The

Jeandron, W. J.
Johns-Manville, Inc.
Johnson Fare Box Co.

McGraw-Hill Book Co., Inc.
McGuire-Cummings Mfg. Co.
Meisel Press Mfg. Co.
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Morganite Brush Co., Inc.

National Brake Co.
National Railway Appliance Co.
National Safety Car & Equipment Co.
Nelsonville Brick Co.
Nichols-Lintern Co.

Ohio Brass Co.
Ohmer Fare Register Co., Inc.

Perey Mfg. Co.

Railway Utility Co.
Rooke Automatic Register Co.
Root Spring Scraper Co.
Russell Mfg. Co.

St. Louis Car Co.
Samson Cordage Works
Silver Lake Co.
Smith Heater Co., Peter
Smith-Ward Brake Co.
Standard Steel Works
Star Brass Works
Stucki Co., A.

Taylor Electric Truck Co.
Tool Steel Gear & Pinion Co.
Tubular Woven Fabric Co.

Van Dorn Coupler Co.

Weierback Brake Shoe Co.
Wendell & MacDuffie Co.
Woods Fare Box Co.

"LE CARBONE"
CARBON BRUSHES

Uniform in Quality

—*in the station*

—*on the motors*

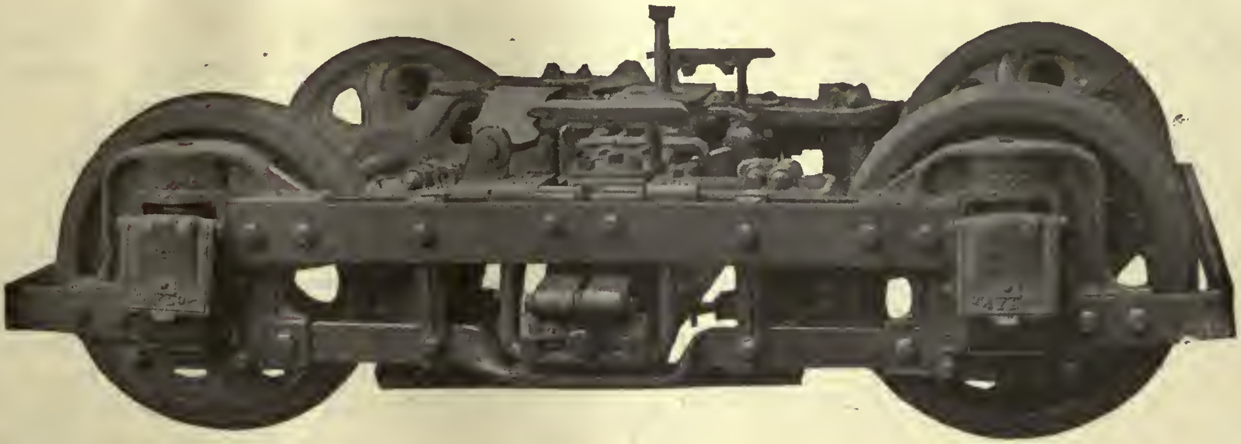
They Talk for Themselves

W. J. JEANDRON
227 Fulton St., New York, N. Y.

Pittsburgh Office:
636 Wabash Building

Canadian Distributors:
Lyman Tube & Supply Co., Ltd.
Montreal and Toronto

—for the modern low-level double-truck car!



TAYLOR Reduced Height TRUCKS

26 in. wheels, journal springs, swing motion, full elliptic bolster springs, low center plate height

TAYLOR STRAIGHT ACTION BRAKES

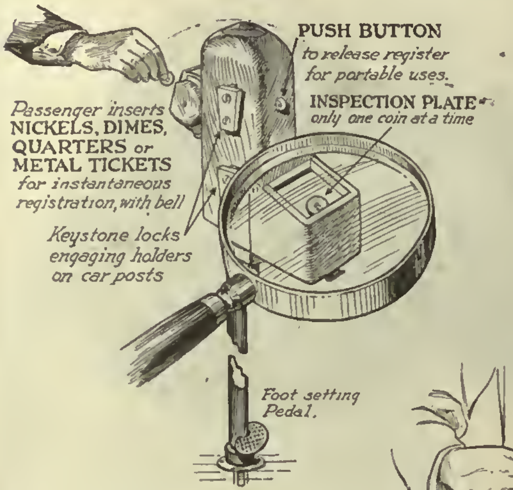
with large diameter pins—Our latest development in brake equipment, especially designed for SAFETY, QUICK ACTION, LONG LIFE AND NOISELESS OPERATION.

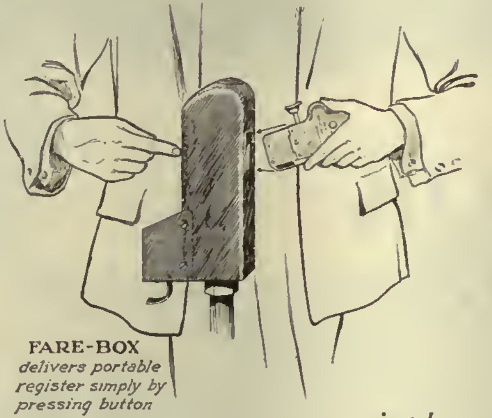
Smoother riding cars increase sales of transportation

TAYLOR ELECTRIC TRUCK CO., Troy, N. Y.

Established 1892 *Send for Portfolio*

Standardization in Fare Collection *by using*


PUSH BUTTON
to release register for portable uses.
INSPECTION PLATE
only one coin at a time
Passenger inserts
NICKELS, DIMES, QUARTERS or METAL TICKETS
for instantaneous registration, with bell
Keystone locks engaging holders on car posts
Foot setting Pedal.


FARE-BOX
delivers portable register simply by pressing button

Study carefully all illustrations

Discussing "FARE COLLECTION" at a recent meeting of operating men, a well-known executive is reported as saying:—

"Fare collection is now a mess. In our operation we have hardly a conductor who does not operate two or three different kinds of registering equipment. For every man dropped when we started one-man cars, we had to dig up at least one old register we never expected to use again.

"While 'Two blades of grass where but one grew before' may indicate good agriculture, two or three kinds of auditing equipment on a street car indicates nothing but sure multiplication of trouble and financial guess-work. These constant changes in rules as regards how passengers should pay and how conductors should collect not only create confusion and pile up auditing forms to fuss with, but *cheapens and steadily breaks down the registering-box collection method we spent big money to establish.* Simply because a conductor is physically able to operate one more register or punch a few more cards, or mentally able to grasp more new rules and quickly figure, for instance, the amount each interurban passenger should pay on the mileage basis, etc., *does not mean that we get the money.* It may easily mean just the opposite. The conductor is doing too much and the passenger too little, as regards fare registration, under such systems.

"Mechanical registering systems, *which give only registered money to the conductor,* have been recommended by our Association and, in my judgment, *all valuable forms of fare should be so collected.*

"The trouble has been that mechanisms serving this proper collecting principle, have not been rigged to meet all our collecting contingencies. The penny nuisance, rapid changes in fare units together with our gradual conversion to the idea that even a one-man car can do interurban work, etc. —these have been troublesome factors but not the real obstacle. The real handicap has been that heavy and bulky stationary boxes have always been lame in flexibility. The big box is *too* stationary. You cannot go after fares with it and *we still have to go after fares.*

"What we need is some small and versatile passenger-operated machine for both fixed point collecting on prepayment and one-man cars and also suitable for all forms of go-after-'em collecting on interurban cars, open cars and for all emergency or street collecting.

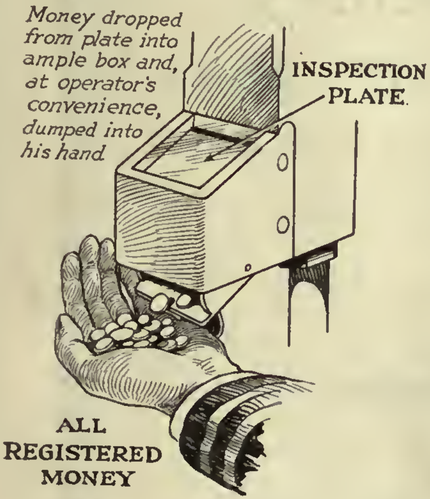
"The fact is that ours is an industry rather poorly served by inventors and manufacturers whose job it should be not only to build new type cars but also supply adequate fare collecting equipment permitting of the standardization so necessary on all types of cars."

the new Rooke BOX-PORTABLE

Not as a cure-all, but as a big help toward efficient uniformity in fare-collection, we announce the ROOKE BOX-PORTABLE.

It may be described as an 18 lb. stationary fare box and a 23 oz. portable register combined for team work as an all-purpose coin collecting unit.

While we have had the ONE-MAN CAR particularly in mind the combination meets all sorts of collecting conditions. Installed as a stationary box for fixed point collecting, the conductor simply presses a button to unlock and lift out the familiar ROOKE portable when it is necessary to go after fares. *Fare registration is positively determined at passenger's finger tips.* Everything traveling south of this first point of contact between coin and mechanism, *is your money.* It cannot be diverted. The register cannot be tricked. The conductor cannot be imposed upon. The fare-box housing is merely a shell or holder of aluminum and bronze castings with a few large, free-working, metal-encased parts that will not get out of order.


Money dropped from plate into ample box and, at operator's convenience, dumped into his hand
INSPECTION PLATE
ALL REGISTERED MONEY

With either the "big box" or the "little box," so called, all your cash and metal ticket collections *are always paid and registered in the same way no matter where, when or on what type of car collected.*

The proper party always registers the fare, i.e.—*the passenger.*

The proper party always has full collection control, i.e.—*the conductor.*

A Better Fare Box

The instant each coin is paid, several important things happen simultaneously, viz:—

(a) Correct value is registered.

(b) Bell rings.

(c) Coin appears on inspection plate.

(d) Slot mouth of register is positively closed, giving conductor absolute control of any later coin payment.

In order that further business may be transacted, conductor must press foot lever pedal (as illustrated) which instantly . . . .

(a) Opens coin slot for receipt of next coin and

(b) Drops into the ample coin box for later convenient removal, the coin last shown on inspection plate.

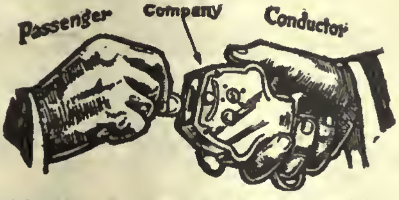
This foot lever has absolutely nothing to do with registration. Its operation is unavoidable, and the only slight job of manual labor attaching to the box operation.

The Inspection Plate

(A comparison in fare-box principles)

The Gravity-Box Plate

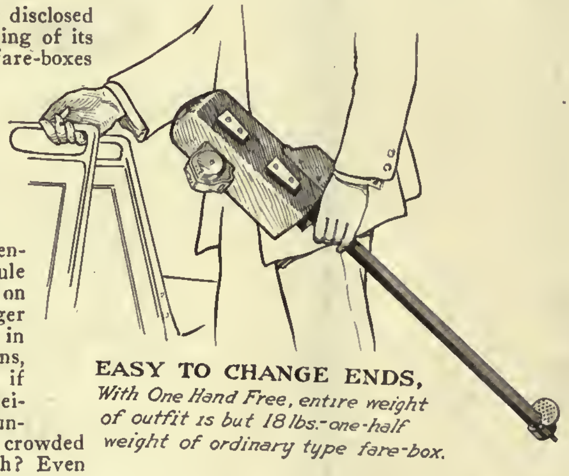
The efficiency of any fare-box is disclosed by facts relative to the functioning of its inspection plate. Gravity fare-boxes show only *unregistered* money on this plate. It is a veritable no-man's land for your cash which is under observation but belongs to no one and must still be fought over. With such boxes the rule about "dumping" this plate is not easily observed or enforced. It is like the old rule against bunching registrations on the clock register. The passenger simply opens his hand or tosses in his coin and several such coins, many times paid simultaneously, if not trapped at the top of box, leisurely rattle down to join other unregistered coins on the already crowded inspection plate. Who paid which? Even the alert conductor cannot identify the coin with the passenger paying same. Wrong coins are paid or payment is entirely evaded. Knowing that he cannot control the situation, the conductor adopts a door-man attitude towards his work and simply does the best he can. If he rings up on a clock register, as a double check, the records rarely agree and the conductor knows he should not be held personally responsible under such a system. The manual labor in this type of fare-box use consists in carrying the heavy box around, dumping the inspection plate as often as the operator may consider necessary and in the cranking process necessary to finally register the fares.



The familiar *Rooke Portable* as used in going after fares.

The Rooke Fare-Box Inspection Plate

The plate shows but one-coin-at-a-time and that coin is always registered before it reaches the plate. The conductor need not scrutinize passenger or bother himself about what happens at the point of coin insertion. What happens there is told instantly on the inspection plate which the conductor cannot well avoid noting, as it is immediately under his eye. The inserted coin instantly rests on this plate and can be scrutinized in advance of the foot lever operation. Inserted coins are not "dropped" into the box or left to leisurely appear on inspection plate. Coins are gripped (which means correct registration that instant) being seemingly "tugged" from passenger's fingers and positively hustled into view for inspection. Coins can be paid with great speed. The foot lever operation is no delay to coin payment. If several passengers were able to drop coins at the same time it would injure rather than enhance the value of the box to you. Manual labor in operating the ROOKE fare-box consists in carrying it about should that be necessary and operating the foot lever with each coin paid. This lever operation forces the conductor to give attention to fare payment, which is decidedly in your interest. He is held right on the job. This is not objectionable to him so long as he knows he has the means of controlling the situation—which he lacks in the operation of gravity boxes. The passenger cannot impose on the conductor. This means that the conductor can be held to an exact accounting. In the event of need for questioning passenger regarding coin paid, the conductor simply withholds the lever operation and the fare-box will not receive coins until the transaction under dispute is properly adjusted.



EASY TO CHANGE ENDS,
With One Hand Free, entire weight of outfit is but 18 lbs.-one-half weight of ordinary type fare-box.

Auditing

The ROOKE BOX-PORTABLE will permit the conductor to hold the same register for a full day's work regardless of the different cars he works on or the difference in methods used in collecting fares. The ROOKE portable is kept in the car house office, is issued from there and returned there at the conclusion of the day's work. No data regarding records or actual cash is tied up in some remote fare-box. **The most direct and economical auditing is possible.** The box housing may remain on the car because it is merely a shell and contains within it nothing having to do with registering mechanism or records.

In operations where the BOX-PORTABLE is used exclusively **for fixed point collecting**, the portable register may be, if desired, locked into the box housing so that only car-house or other authorized officials can remove same.

Installations

We have orders for installations which we hope can be cared for by the time this Convention issue is being read.

Rooke Automatic Register Company, Providence, Rhode Island

Johnson Fare Box

Get ALL the Money

Maximum Revenue is your chief concern right now.

Why, then, permit any shrinkage between the total amount earned and the amount that goes into the treasury? Any loss in fare collections is chargeable directly to the management.

The full amount can be collected within a fraction of one per cent by installing

Johnson Fare Boxes

and maintaining a systematic, business-like force of checkers to see that all of the money is deposited and registered at the source. Johnson Fare Boxes cost you nothing—merely advance the price against the cash return, which begins the minute you place them in operation.

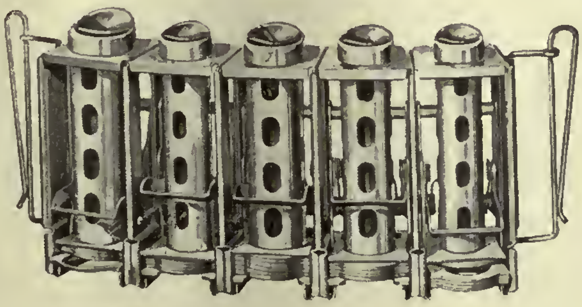
Complete information and prices
on application.

JOHNSON FARE BOX CO.
Ravenswood, Chicago, Illinois

Johnson System

FOR INCREASED REVENUE

Johnson Universal Changer



Help the Conductor Get It

Maximum revenue and fast service are closely related.

A conductor with a Johnson Universal Money Changer is a lightning change artist.

He can keep a stream of boarding passengers constantly moving because he can eject the proper number of coins or metal tickets at a single operation.

An outstanding feature of this device is the readiness with which it can be adjusted to handle any new number of coins, should the rate of fare be changed.

Another important feature of the Johnson Universal Changer is the ease with which it can be assembled to any combination of barrels without the use of tools.

Any number of barrels may be used. Barrels are designed for quarters, dimes, nickels, pennies and metal tickets of two denominations—.900 or .650.

Prices on Application.

JOHNSON FARE BOX CO.

Ravenswood, Chicago, Illinois

# of Fare Collection

FOR BETTER SERVICE

International Fare Registers

The single R-10 and double R-5 models illustrated here are two widely used types from the International line.

They are easily operated by hand or foot, either mechanically, or by an electric or pneumatic device.

Complete the Fare Collection System with Accurate Registration

Fare registration, the point of contact between the company, the platform man, and the passenger, must be accurate and complete. In this way only can the facts concerning revenue and passengers be determined.

Inaccurate registration, or data not known to be absolutely dependable, makes itself felt all along the line, through accounting department, operation, and even to plans for future operation methods and policies.

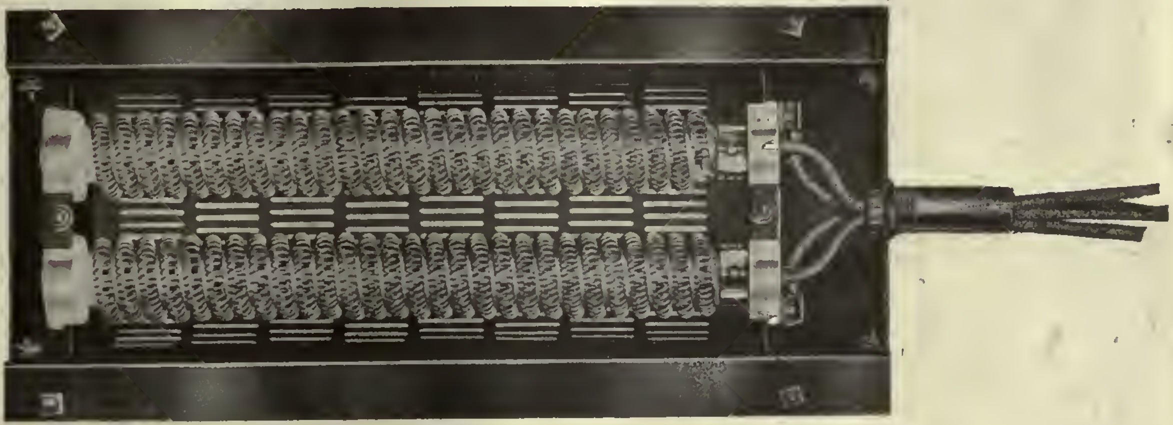
The accurate record provided by International Registers gives a firm basis for judgment; dependable figures to indicate the steps necessary to a solution of today's problems.

International Fare Registers have been and are today the standard equipment of the leading Electric Railways and city systems throughout the country. For almost a quarter of a century they have demonstrated themselves to be not only accurate in their registration, but so rugged in construction as to give enduring service.

Exclusive selling agents for HEEREN ENAMEL BADGES.

THE INTERNATIONAL REGISTER COMPANY
15 South Throop Street, Chicago

GOLD'S
ELECTRIC HEATERS
CUT INSTALLATION AND MAINTENANCE CHARGE


Interior View No. 405E Cross Seat Heater, (Deflector Removed) Showing Ease in Removing Heating Elements

Application of No. 405E Heater to Cross Seat. Showing Heat Deflector

GOLD'S INTERCHANGEABLE ELECTRIC HEATERS

The Solution of the Heater Problem

HEATING ELEMENTS INTERCHANGEABLE IN ALL TYPES OF HEATERS SHOWN IN OUR BULLETIN NO. 4

Many Thousands of Our Heaters Are in Use on the Following Railways:

Brooklyn Rapid Transit
Interborough Rapid Transit
Public Service Ry., N. J.
Connecticut Co.
Worcester Street Ry.
New York Central R.R.
Long Island R.R.
Boston Elevated R.R.
Bay State Street Ry.
Springfield Ry., Etc., Etc.

Are You Reaping the Benefits of These Improvements?

GOLD'S THERMOSTAT CONTROL

Quickly pays for itself in the saving of current

is not subject in its operation to case temperature, therefore, when heat is first applied to car it becomes active one to two hours sooner than when closed cases are used.

GOLD'S VENTILATORS

Scientifically correct.
Can be left open at all times.

Literature on Request.

GOLD CAR HEATING & LIGHTING CO.
Bush Terminal
220 36th Street, Brooklyn, N. Y.

B'DWAY-7th AVE. NORTH
P. M.
This Coupon denotes that hour punche on body of transfer
P. M.
Not good detache
OCT. 11,
GLOBE TICKET COMPANY, PHILA., PA.
8 NOTCH PERFORATION 20
Broadway-7th Ave Line North
NEW YORK RAILWAYS COMPANY
Good only for a continuous trip in direction indicated if presented before time canceled at point indicated by punch mark hereon. JOB E. HEDGES, Receiver
Upon surrender of entire ticket
Issued only to passengers boarding cars on Broadway between 23d St and 34th St
At 34th St and Broadway W only on 34th St Cross-town cars
N on Lexington
59th St E. or W on 59th

Globe Transfers Prevent Congestion

Herald Square, the junction point of three surface lines, is one of New York's—and the world's—busiest centers. Ease and speed in handling the cross currents of human traffic are vital. **Globe P.M. Coupon Transfers are standard equipment on these busy lines.**

Present-day conditions demand quick action in issuing transfers. No form gives such instantaneous results and such complete freedom from abuse as our P.M. Coupon style. They have been instrumental in the upbuilding of nearly every great Electric Railway.

Aren't rapidity and protection worth something to you, too?

GLOBE TICKET COMPANY

112-114 North 12th Street
Philadelphia, Pa.

ODD FARES MADE EVEN

Fare Tickets—book or strip—eliminate odd change, save time and temper.

They are accurate, economical, non-counterfeitable, easy to check—and

QUICK!

Perey Turnstiles at Brooklyn End of Williamsburg Bridge.

PEREY TURNSTILES

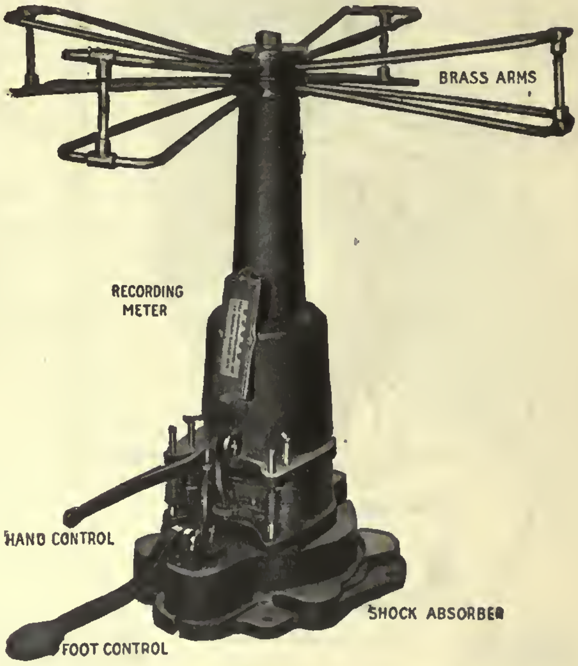
Secure Every Fare for the Company

"The intending passenger cannot pass without paying the Company."

That's the secret of the 100% fare collection capacity of the Perey Turnstile. People may slip by the conductor or the stationary platform fare box. Or worse still, the conductor may get the fares but fail to register them all. But the Perey turnstile makes every passenger pay and register his own fare.

Intending passengers can be paying fares and entering the loading platform while waiting for the cars to arrive. That's why cars make better time, where Perey Turnstiles are used at heavy traffic stations.

One woman clerk can make change and pass 45 to 50 passengers per minute, all the while protected in a warm, well-lighted and safe booth. The attendant has absolute mastery of the crowd, through the foot pedal control on the turnstile. The accurate recording meter prevents errors and losses.



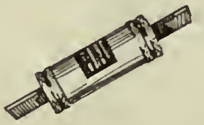
Other Notable Installations:

Brooklyn Rapid Transit Company
Des Moines City Railway Company
Emergency Fleet Corporation
Philadelphia Rapid Transit Co.
Public Service Railway Co., of New Jersey
Tidewater Power Company, Wilmington, N. Car.
United R'ways & Electric Co., of Baltimore, Md.
United Railroads of San Francisco

PEREY MANUFACTURING CO., Inc.

30 Church Street
New York

Making Renewable Fuses Renewable



"Noark" renewable and non-renewable cartridge enclosed fuses, in all standard capacities, are approved by the Underwriters' Laboratories, Inc., under the label service.

"Noark" Fuses and all other Johns-Manville packaged Electrical Materials are distributed strictly through Distributor-Dealer channels on a basis that gives full protection to all concerned. Dealers can get all details from their Distributor. Distributors, for samples and complete information, should apply to the Electrical Department of the nearest Johns-Manville Branch.

IF you have ever had trouble renewing "Renewable" Fuses, due to the sticking or freezing up of the parts from adhering metallic particles, you will appreciate the features that make such a thing practically impossible in "Noark" Renewable Fuses.

"Noark" Fuses do not "freeze up"

This is the result of several noteworthy features of design and construction.

The link, for instance, is of the drop-out type, which insures that under the most severe short circuit conditions an instantaneous opening of the circuit will result, but in addition, permits only the minimum amount of metal to fuse and vaporize.

Then, too, the gun metal finish of the washers, cap and ferrule prevents what little metal is fused or vaporized from sticking to these parts.

"Noark" Fuses are simple in construction

When a fuse blows—it is an easy matter to take it apart. The sure-grip knurled brass caps are unscrewed from the ends; the solid slotted disc washers are slipped off the knife blades; the lock washers are removed as the knife blades are withdrawn and the fused link is replaced with a new one.

"Noark" Fuses are renewable innumerable times

"Noark" Fuse Cartridges are of specially manufactured horn fibre, with machined metal to metal end fittings. The washers are ground to size, not just stamped out. There are no packing washers to renew after every operation.

"Noark" Fuses are properly vented

The venting of "Noark" Fuses is accomplished through the scientifically arranged gas paths without noise or flash.

Note the appearance of "Noark" Renewable Fuses

When you buy renewable fuses, look for the characteristic grey body, the *gun metal* finish of the knurled cap and the bright copper blades. This combination will enable you to recognize "Noark" Renewable Fuses anywhere. Their individuality is clearly apparent and classifies them as the dependable protection you should buy.

JOHNS-MANVILLE
Incorporated
Madison Avenue at 41st Street, New York City
Branches in 64 Large Cities
For Canada: CANADIAN JOHNS-MANVILLE CO., Ltd., Toronto

JOHNS-MANVILLE SERVICE
COVERS THE CONTINENT

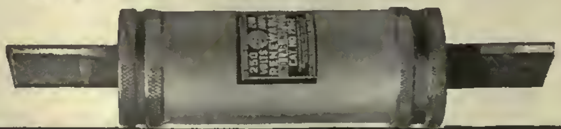
Through—

Asbestos

and its allied products

JOHNS-MANVILLE
Serves in Conservation

Heat Insulations, High Temperature Cements, Asbestos Roofings, Packings, Brake Linings, Fire Prevention Products



JOHNS-MANVILLE
ELECTRICAL MATERIALS

The Mechanical Department Will Approve O-B Car Equipment

Give any man in the mechanical department one of the O-B Car Equipment Specialties and ask him how he likes it.

Let him take it apart to judge its strength and put it together to see its simplicity. Let him see it operate.

We'll stand by his opinion.

O-B Car Equipment Engineers are particularly fortunate in having behind them a manufacturing organization which can do justice to the designer's ideas.

So O-B Devices work properly and live long.

O-B Car Equipment includes automatic car, air and electric couplers, bases, catchers, retrievers, pick-ups, trailer connectors, hose bridges, sander and whistle equipment. O-B organization, exclusively, sells Imperial Headlights in U. S.

Interested in Trollibuses?

Naturally, a new thing like trackless trolley brings new problems. The O-B organization will be glad to discuss the situation with you—with particular reference to the trolley material required and the method of current collection.

See also page 39

The Ohio B Brass Co.
Mansfield, Ohio, U.S.A.

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA 1921

New York Philadelphia Pittsburgh Charleston, W.Va. Chicago Los Angeles San Francisco Paris, France

Products: Trolley Material, Rail Bonds, Electric Railway Car Equipment, High Tension Porcelain Insulators, Third Rail Insulators

Remember

Detroit (Mich.) Municipal Railway, mentioned in the July 23 and other issues as purchasing 100 safety cars on July 12, has issued the following data on these cars.

Number of cars ordered..........100
Date of order..........July 12, 1921
Delivery......Approximately three months
Builder { 25 McGuire-Cummings Mfg. Co. / 50 St. Louis Car Company / 25 Osgood-Bradley Car Company
Type of Car..........Safety
Seating capacity..........32
Weight, total..........16,000 lb.
Truck wheelbase..........8 ft.
Interior trim..........Cherry
Headlining..........Agasote
Roof..........Arch
Air brakes..........Westinghouse DH16
Axles..........4 in.
Bumpers..........6 in. Channel
Car signal system..........Faraday
Car trimmings..........Statuary Bronze
Control..........K 63
Curtain fixtures...Curtain Supply Company
Curtain material..........O'Bannon 076
Designation signs..........Keystone
Fare boxes..........Johnson
Fenders or wheelguards..........H.B.
Gears and pinions....Westinghouse Helical
Heater Equipment..........[illegible]
Headlights..........Golden Glow No. 96
Lightning arresters..........Westinghouse
Motors..........Westinghouse 508
Paint Sherwin Williams, Old Dutch Enamel
Registers....International, R7 Air operated
Sanders..........[illegible]
Sash fixtures..........Howard & Edwards
Seats..........Manufacturers' Standard
Seating material..........Wood Slats
Step treads..........Feralun
Trolley catchers or retrievers..........
Ohio Brass Company
Trolley base..........Ohio Brass Company
Trolley wheels or shoes..........Ideal 4½ in.
Trucks..........Manufacturers' Standard
Ventilators..........Manufacturers' Standard
Wheels..........Steel, 26 in.
Special devices, etc..........
Nichols Lintern [illegible] light
Center lighting..........
Electric Service Supplies Company
Fixtures and opal shade

The 100 new Detroit safety cars are to be like the 150 safety cars now in operation in Detroit, photo above.

Keystone Car Specialties

☐ *Keystone Air Sanders*
☐ *Golden Glow Headlights*
☐ *Illuminated Destination Signs*
☐ *Keystone Steel Gear Cases*
☐ *Safety Car Lighting Fixtures*
☐ *Keystone Motormen's Seats*
☐ *Faraday Car Signals*
☐ *Keystone Trolley Catchers*
☐ *Shelby Trolley Poles*
☐ *Samson Cordage*
☐ *International Fare Registers*
☐ *Fare Register Fittings*
☐ *Keystone Air Valves*
☐ *Keystone Cord Connectors*
☐ *Keystone Rotary Gongs*
☐ *Standard Trolley Harps*
☐ *Standard Trolley Wheels*
☐ *Automatic Door Signals*
☐ *Keystone Trailer Connectors*

ELECTRIC SERV

Manufacturer of Railway Mat

PHILADELPHIA
17th and Cambria Streets

NEW YORK
50 Church St.

the Name—

When ordering Safety Cars or Converting Old Cars do what Detroit does—

Specify

KEYSTONE

Car Specialties

Faraday High Voltage Car Signal System

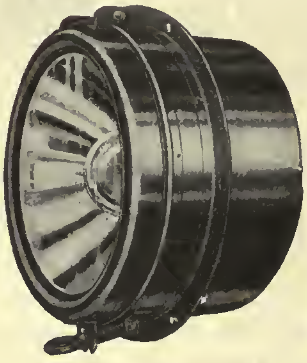
Keystone-Hunter Illuminated Signs

Specification of Keystone Specialties for the 100 new cars mentioned in the clipping on the opposite page, was made because Keystone Specialties are coming across O. K. on safety cars the Detroit Municipal Railway has been operating for some little time.

You, too, will come back a second and third time for Keystone Products after having used them once.

Remember the name—Keystone—Electric Service Supplies Co.—when you talk over safety cars and rebuilt one-man cars at Atlantic City next month. Ask the operators who are using them. That's the best way of finding out their real value although we regret we can't exhibit them to you at the convention.

Slip a copy of our Safety Car Book in your pocket when you leave for the convention. We'll gladly send it together with respective data sheets, addressed to you at Atlantic City.



Golden Glow Headlights

Safety Car Lighting Fixtures

ICE SUPPLIES Co.

erial and Electrical Supplies

CHICAGO
Monadnock Building

Branch Offices:
BOSTON SCRANTON
PITTSBURGH

Canadian Distributors:
LYMAN TUBE & SUPPLY
CO. Ltd., Montreal, Toronto

GRIFFIN
F. C. S. Wheels

From the standpoint of both *Economy* and *Safety* the CHILLED IRON WHEEL is the ideal wheel for *all classes of service.*

**LOW COST
MAXIMUM
MILEAGE**

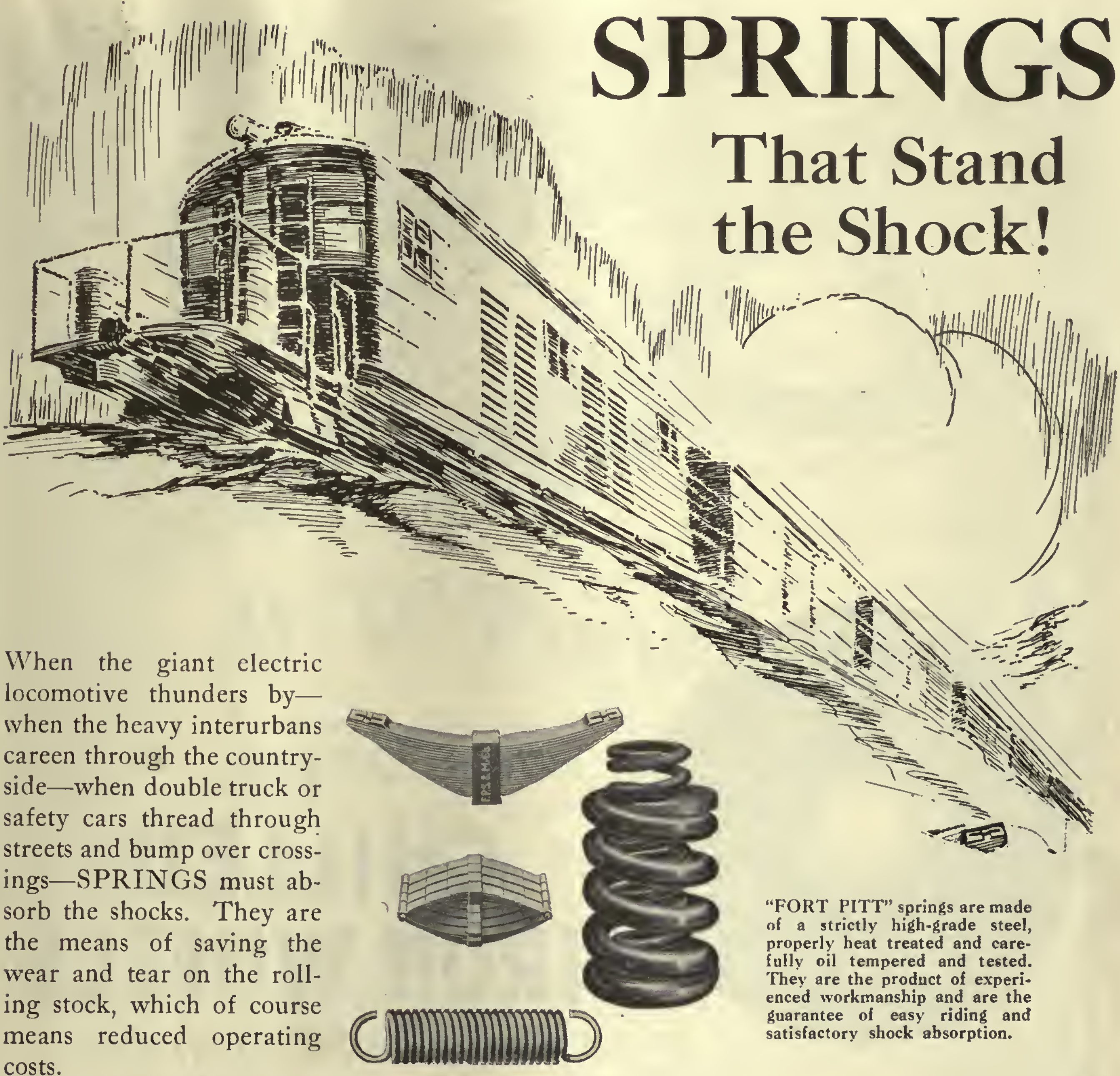
**Facilities at each foundry for
mounting wheels on axles**

Griffin Wheel Company
McCormick Building, Chicago, Ill.

FOUNDRIES:
Chicago Detroit Boston Los Angeles Denver
St. Paul Tacoma Kansas City
Council Bluffs.

SPRINGS

That Stand the Shock!



When the giant electric locomotive thunders by—when the heavy interurbans careen through the countryside—when double truck or safety cars thread through streets and bump over crossings—SPRINGS must absorb the shocks. They are the means of saving the wear and tear on the rolling stock, which of course means reduced operating costs.

"FORT PITT" springs are made of a strictly high-grade steel, properly heat treated and carefully oil tempered and tested. They are the product of experienced workmanship and are the guarantee of easy riding and satisfactory shock absorption.

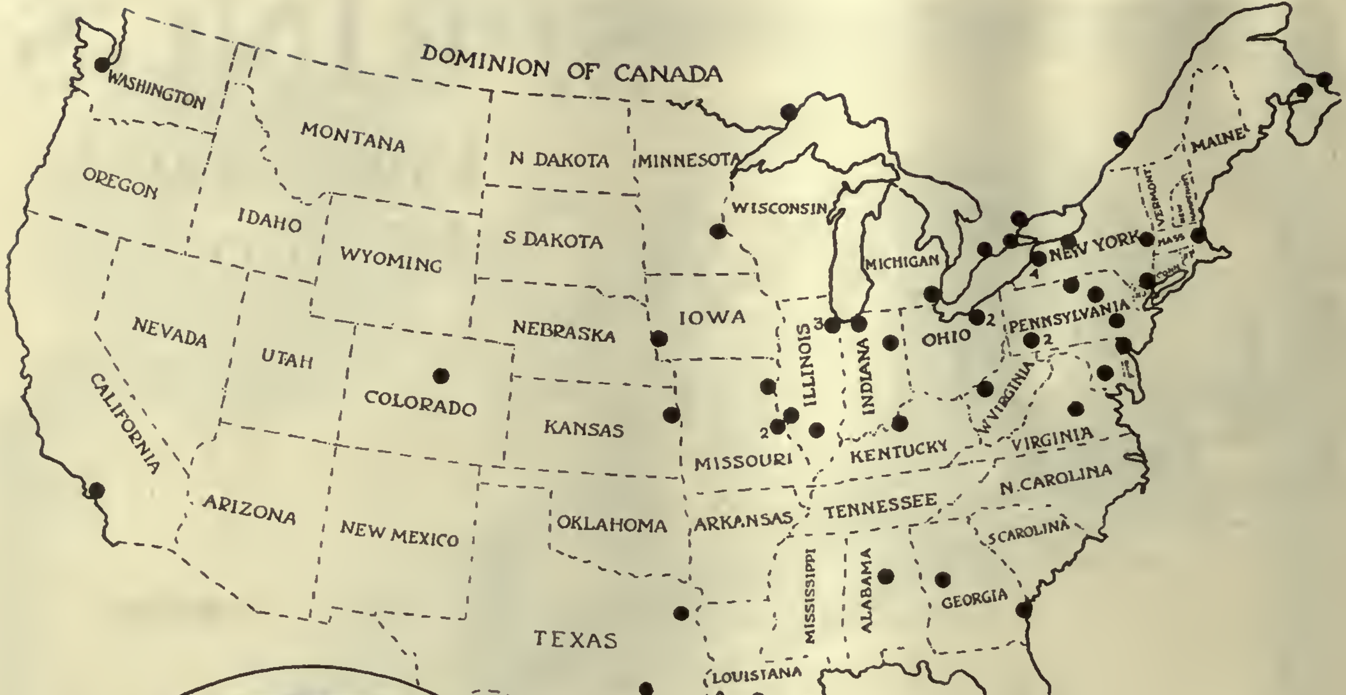
Many of the steam and electric roads, particularly the smaller roads, not having large Mechanical Departments, are now operating under high costs due to incorrectly designed and improperly tempered springs. Our many years' experience in designing and furnishing this class of material has put us in position where we have been able to work out spring problems to the ultimate advantage of those interested. If a saving in operating cost is desired, get in touch with us regarding spring matters.

Fort Pitt Spring & Manufacturing Company

Pittsburgh, Pa.

Branch Offices:

Chicago, Ill.
Denver, Colo.
Detroit, Mich.
St. Paul, Minn.
Salt Lake City, Utah
San Francisco, Calif.
Washington, D. C.
Louisville, Ky.
New Orleans, La.
New York, N. Y.
Philadelphia, Pa.
Portland, Ore.
Richmond, Va.
St. Louis, Mo.



49 The map above shows the location of the 49 foundries in the United States and Canada, represented by the Association of Manufacturers of Chilled Car Wheels

Chicago 3
St. Louis 2
Buffalo 4
Pittsburg 2
Cleveland 2
Amherst N.S.
Montreal
Mich. City, Ind
Louisville
Mt Vernon, Ill
Ft. Wayne, Ind
Birmingham
Atlanta
Savannah

Boston
Detroit
St. Paul
Kansas City, Kan
Denver
Tacoma
Rochester, N.Y.
Sayre, Pa
Berwick, Pa.
Albany
Toronto
New Glasgow N.S
Madison, Ill.

Huntingdon W Va
Wilmington, Del
Houston, Tex
Hannibal Mo
Reading, Pa
Baltimore
Richmond, Va
Ft. William, Ont
St. Thomas, -
Hamilton,
Ramapo, N.Y
Marshall, Tex
Los Angeles
Council Bluffs

AMERICAN RAILROAD ASSOCIATION STANDARDS

650 lb. wheel for 60,000 Capacity Cars
700 lb. wheel for 80,000 Capacity Cars
750 lb. wheel for 100,000 Capacity Cars
850 lb. wheel for 140,000 Capacity Cars

The Standard Wheel for Seventy Years

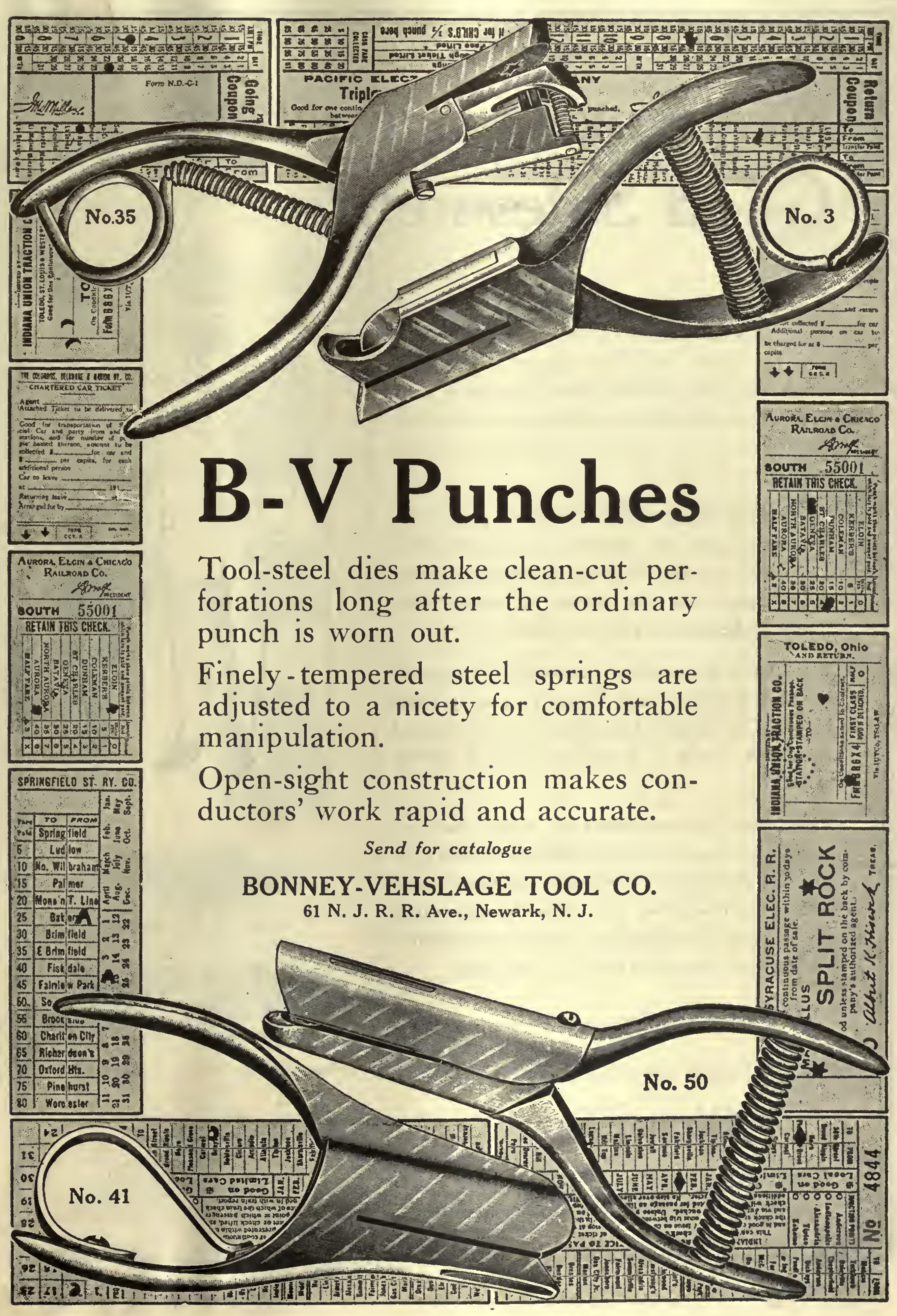
Where
CHILLED IRON WHEELS

are made for Railway and Street Car Service

Capacity 20,000 per day
25,000,000 in Service

Association of Manufacturers of Chilled Car Wheels

1847 Mc Cormick Bldg.
CHICAGO



B-V Punches

Tool-steel dies make clean-cut perforations long after the ordinary punch is worn out.

Finely-tempered steel springs are adjusted to a nicety for comfortable manipulation.

Open-sight construction makes conductors' work rapid and accurate.

Send for catalogue

BONNEY-VEHSLAGE TOOL CO.
61 N. J. R. R. Ave., Newark, N. J.

Are Your Conductors Good Salesmen?

Selling transportation to the public is the big idea just now. Your conductors are in close touch with your public. They constitute your point of contact. Are you cultivating their ability to serve you and their will to serve you more effectively?

The Ohmer System of fare collecting and fare accounting puts the conductor in the position of a responsible salesman of transportation, and he soon learns that the better he serves your interests the better he serves himself.

The Ohmer System gives him means for indicating and recording each transaction as it takes place. This is good business. Every successful merchant knows it is the best way to handle sales.

The Ohmer System points out to the management, the characteristic tendencies of each conductor and indicates the sort of discipline which will do the most good. The Ohmer System stands for the best of modern business methods applied to city and interurban electric railroading.

Ohmer Fare Register Company
Dayton, Ohio

BUZZERS

RESISTANCE UNIT

SIGNAL LIGHT

SINGLE STROKE BELLS

SAFETY SWITCH

RESISTANCE BOXES

FUSE BOXES

THERMOSTAT

MAGNETIC SWITCH

PNEUMATIC DOOR ENGINES

CROSS SEAT TYPE ELEC. HEATER

Consolidated Car Heating Company Devices

Turn Trainmen Into Salesmen

with

Consolidated Electric Heaters Door Devices Automatic Signals

These, together with other Consolidated equipment shown in the exhibit at the left, will so increase the efficiency of trainmen that they will have more time and opportunity to devote proper attention and care to passengers, both actual and prospective.

Every one of these devices tends to improve service and increase the convenience, comfort and safety of passengers.

Heaters—which are thermostat-controlled, will maintain an even, comfortable temperature in cars at all times without attention.

Doors—which operate singly or in multiple, by push button control lighten, conductor's labor and save his time.

Signals—which advise the motorman the instant every door is closed, save seconds ordinarily lost by hand signals, and are safer.

See following pages for further details

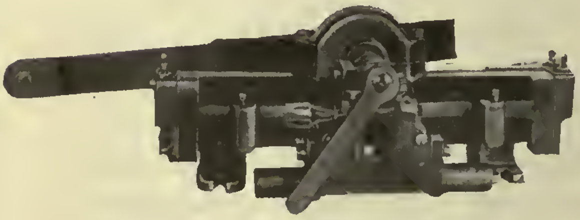
Consolidated Car Heating Co.

Albany New York Chicago

CONSOLIDATED CAR HEATING COMPANY

CONSOL

Pneumatic Door Engines



Standard Geared Type Door Engine

The Trainman pushes buttons on a keyboard—the rest is automatic

One door, two doors, a whole car, or the doors of an entire train may be controlled by one or more trainmen, by the proper grouping of control buttons. On the big subway cars of the N. Y. Municipal Railway Corporation, one man operates six doors. On the Boston Elevated Railway Company's Cambridge Subway and elevated cars, one man between two cars handles twelve doors.

This door engine almost has brains—it never slams, it closes doors quickly but gently without hurting force, and when equipped with reversing shoes they instantly rebound if they touch any person not clear of the door-way.

Yes! The Starting Signal Is Automatic, Too!

When all the doors are closed—but not till then—blink! on goes the signal light in the motorman's cab, and off goes the train. No standing still while "two bells" pass up through several cars. Good for single cars, too.

CONSOLIDATED

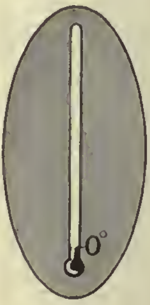
Albany

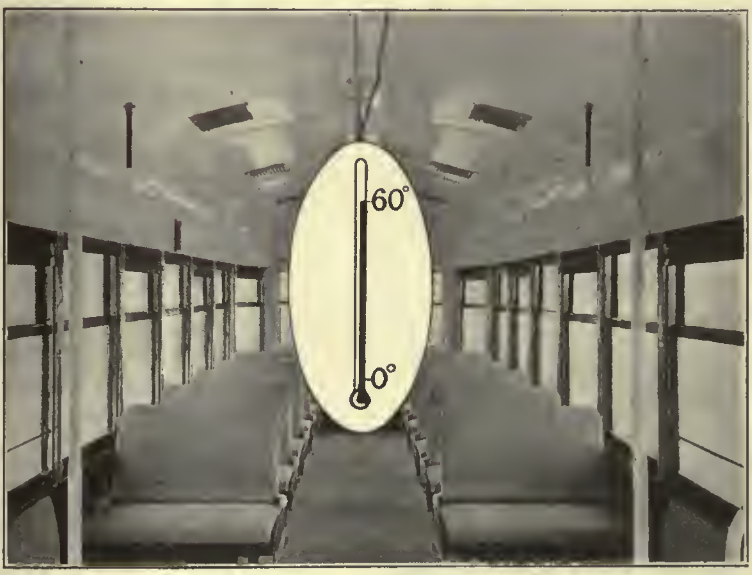
IDATED

Electric Heaters With Thermostat Control

Use Zero Weather to Advertise for Traffic

Make the uniformly comfortable temperature of your cars an advertisement for traffic. People will ride in warm cars in preference to cold autos.





Cross-Seat Type of Heater Installed Under Seats

Uniform Temperature without attention from Trainmen

The opening and closing of car doors causes wide variations in interior temperatures. This means that hand controlled heaters may have full heat on most of the time to provide for these drops. Right here is where thermostatic control comes in automatically and continuously maintaining the desired temperature without waste of current.

CAR HEATING CO.

New York **Chicago**

The Only Things That Count Are Results

The results you want are more passengers and better-satisfied passengers, together with any reductions in costs that can be secured.

With New Cars or Rebuilt Cars

With little safety cars or double-truck city cars, with the big, luxurious cars in interurban service, or the monster rolling stock of subway systems, these desirable results are brought a little nearer to attainment by the use of Consolidated appliances, the little things in size and cost, that amount to big things when measured in terms of public good will.

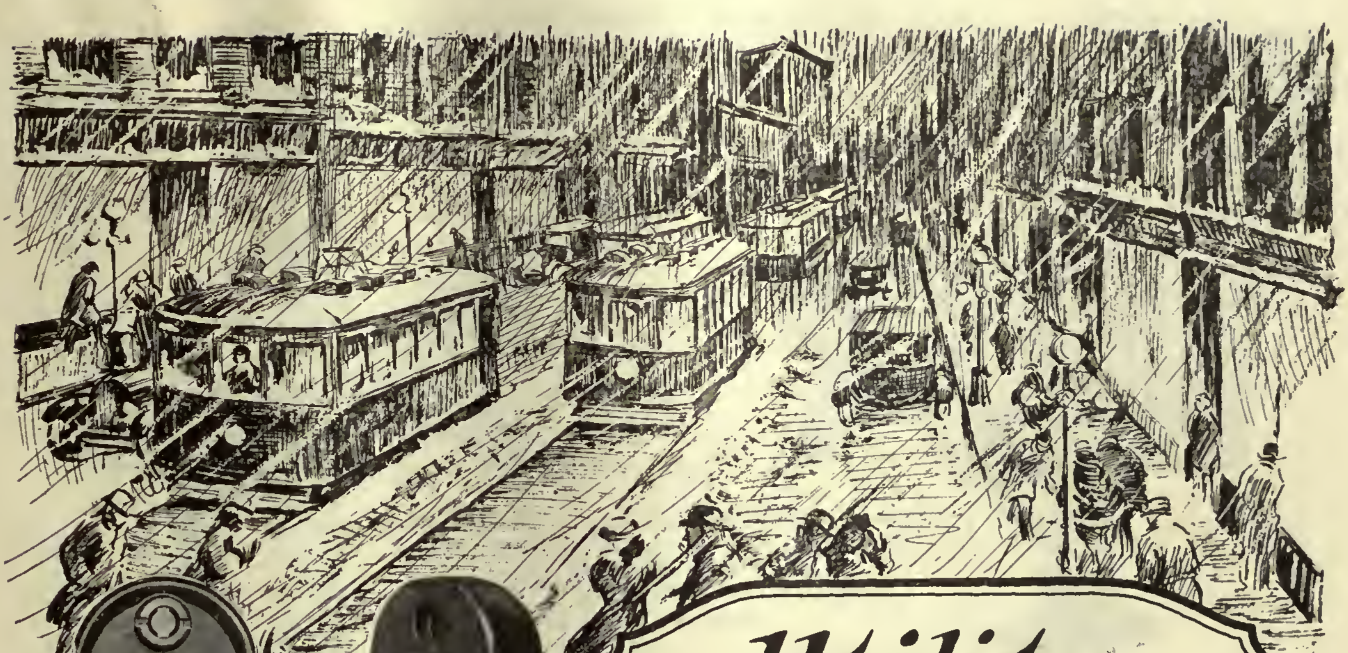
Even the Buzzer Signal System

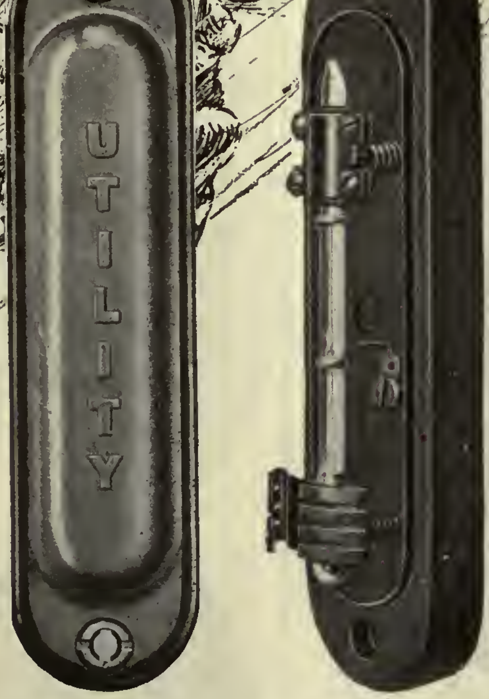
So small an item when compared with trucks, and motors and brakes and all the big equipment, a buzzer seems far more significant to the passenger, because he comes into direct contact with it himself, makes it announce his desire as to stopping the car.

Consolidated trolley circuit buzzer systems are reliable, loud and clear-toned, *and they work!* That builds good will and thus helps sell transportation.

Send for complete set of bulletins today

Consolidated Car Heating Co.
Albany New York Chicago





Utility

IN EVERY state in the Union Utility Ventilators and Utility Heat Regulators keep electric railway patrons comfortable and pleased with the least cost to the company.

Over 135,000 Utility Ventilators in service on steam and electric railways are working automatically to provide adequate ventilation continuously. The air in the car is always pure and fresh, whether the car is moving or standing. Installation cost is moderate, and maintenance extremely low.

More than 18,000 cars are equipped with Utility Heat Regulators, maintaining constant temperature inside the car at the least possible cost for current. The economy of Utility Heat Regulation is an added advantage, for constant temperature cars mean comfort for the passengers which cannot be obtained by hand regulation. Saving of 50% in power costs, which is common on many roads, pays for the installation in an unusually short time.

Complete information on Utility Ventilators and Heat Regulators should be on your desk. You'll need it soon. *Send for it now.*

Cold, *Outside*
Comfort, *Inside*

Railway Utility Co.
Chicago

J. H. Denton, Eastern Mgr., 1328 Broadway, New York
F. S. McNamara, 209 Barth Bldg., Denver
O. W. Meissner, 10 St. Antoine St., Montreal
F. O. Grayson, 600 La Salle Bldg., St. Louis

THE NAME

HALE & KILBURN

Stands for Highest Standard in Electric Car Seating

All Steel Seat
Rattan Spring Cushion

Light Weight Steel Seat
Springless Cushion

BEST SEATS

for every form of

Trolley Buses, Motor Buses, Etc.

Light Weight Stationary Seat
Made in Imitation Leather, Rattan, Wood Slat, etc.

Best Seats for

- City Cars
- Interurban Lines
- One-Man Cars
- Trolley Buses

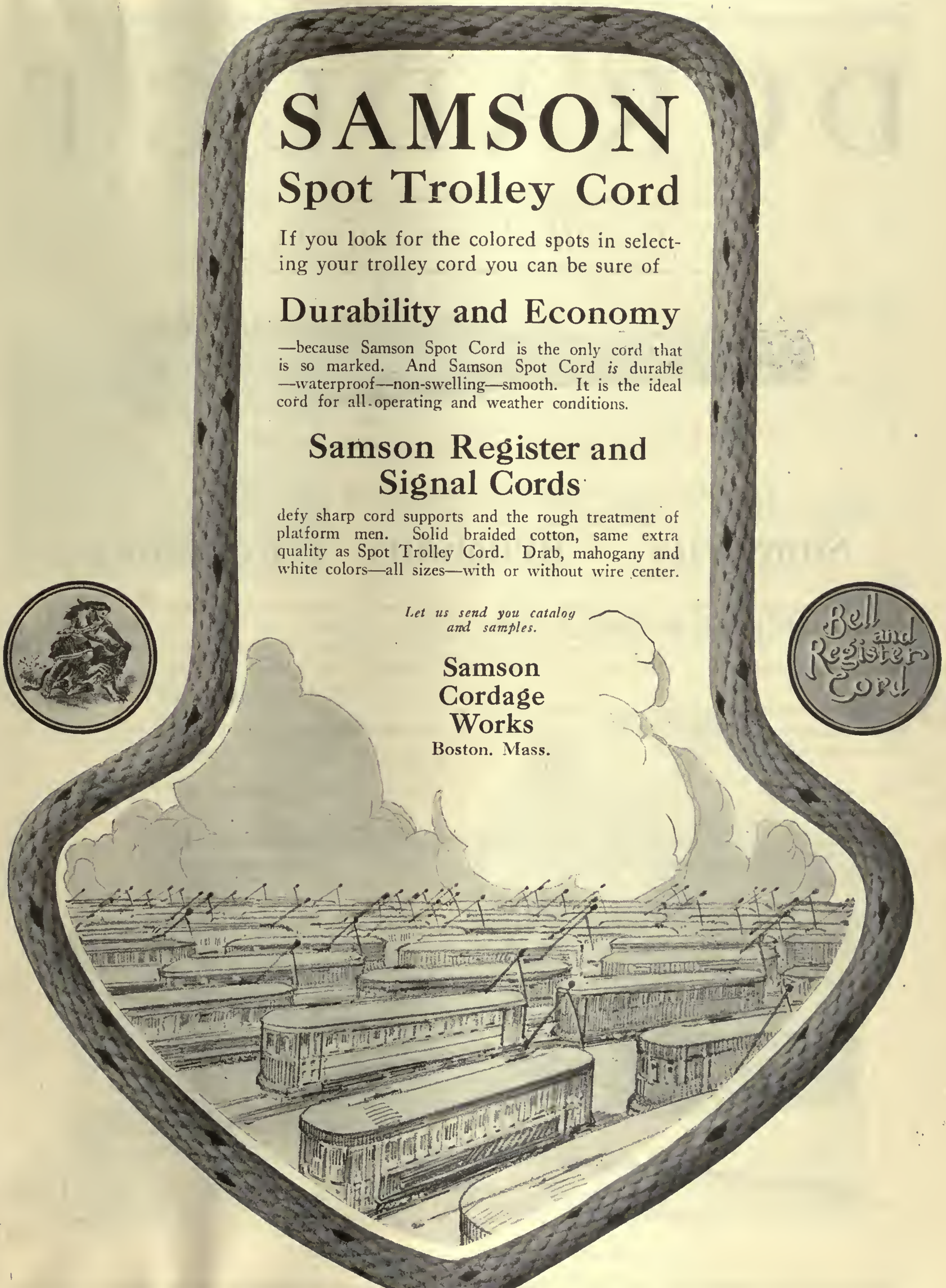
H & K Seats are

- Neatest
- Lightest
- Strongest
- Simplest

Lightest and Best Wood Slat Seat

Standard Interurban Steel Seat

Hale & Kilburn Corporation
American Motor Body Co., *Successor*
Philadelphia
New York — Chicago — Washington — London



SAMSON

Spot Trolley Cord

If you look for the colored spots in selecting your trolley cord you can be sure of

Durability and Economy

—because Samson Spot Cord is the only cord that is so marked. And Samson Spot Cord *is* durable —waterproof—non-swelling—smooth. It is the ideal cord for all operating and weather conditions.

Samson Register and Signal Cords

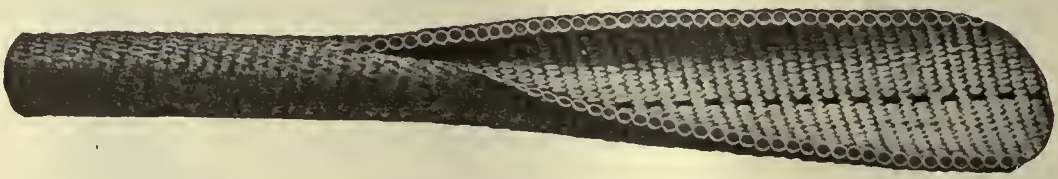
defy sharp cord supports and the rough treatment of platform men. Solid braided cotton, same extra quality as Spot Trolley Cord. Drab, mahogany and white colors—all sizes—with or without wire center.

Let us send you catalog and samples.

**Samson
Cordage
Works**
Boston. Mass.

DURADUCT

for all electric wiring



The Black Dotted Line on the Interior Identifies DURADUCT

DURADUCT Has Put Car-Wiring on a New Plane of

Simplicity Reliability Economy

When Duraduct, the original single-wall conduit with the black dotted line on the interior surface, was first offered to electric railways, it was as something entirely new in the car-wiring line.

That this featherweight, flexible woven conduit could supplant laboriously built trench boxes or metal pipe conduit seemed inconceivable.

But it did!

The electric railways were keen to seize upon a waterproof, fire-resistant conduit that could be installed without marring the car structure, whether for entirely new wiring or for additions to existing wiring to take care of added auxiliaries.

The difference in labor cost over metal is almost as great as the difference in weight.

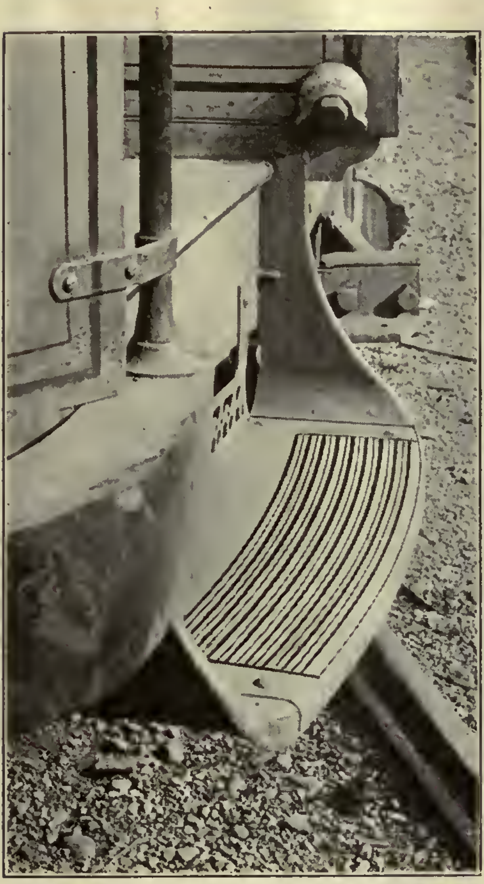
ASK YOUR NEIGHBOR!

Tubular Woven Fabric Co., Pawtucket, R. I.

52 Vanderbilt Ave.,
New York, N. Y.

549 W. Washington Blvd.,
Chicago, Ill.

Duraduct is adopted for Chicago's latest trailer cars.



Curved or Straight—Any Width.
For Car Steps or Stations

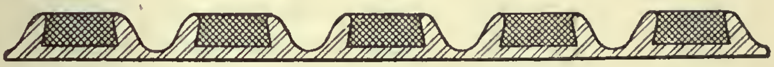
Protect Passengers

Thousands

of street cars are equipped with our products, and we know of no successful suit for damages in any case where they are used. The courts recognize

MASON Safety Treads

as the best available safeguard against accident. The cut tells the story—a solid rolled steel plate with dovetailed grooves filed with lead or carborundum, alternating with open U grooves which will allow moisture to run off freely, keeping the treads dry and clean.



Mason Safety Tread, cross section, any width, with or without nosing.

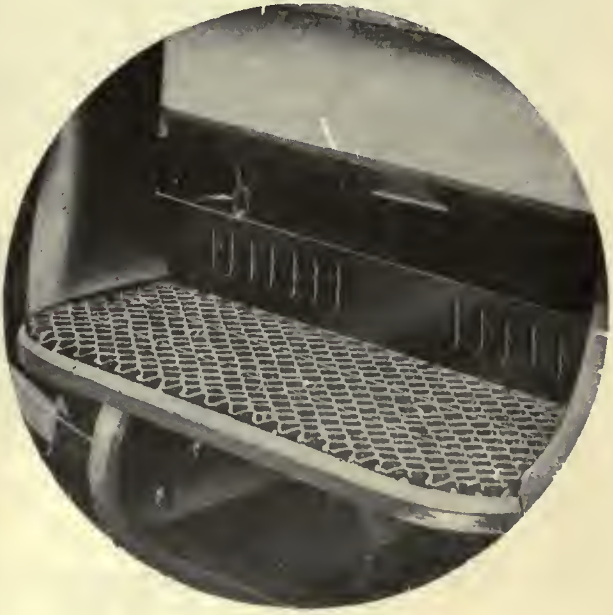
Avoid Damage Suits

Travelers

and street railway men everywhere will recognize this cut representing the

Stanwood Step

The merits of these steps are too well known to require detailed description. They have been used on hundreds of electric lines during a long series of years. They are sanitary, self-cleaning, non-slippery, and extremely durable. Made of high carbon steel, in single, double and triple form. Mud, dirt and snow cannot stick to the honeycomb surface. Send for dimension sheets.



The Wise Manager

will adopt all available means to protect passengers against SLIPPING AND FALLING ACCIDENTS, and thus protect his company against the annoyance and expense of claims for damages by which all public service companies are frequently victimized. It is true economy to provide the safeguards above mentioned, which are manufactured only by us.

Call on us or any of our representatives for full information.

AMERICAN MASON SAFETY TREAD CO., Lowell, Mass.

Branch Offices in New York City and Philadelphia. John B. Ricketts, Kansas City, Mo.
Joseph T. Ryerson & Son, Chicago, Buffalo, Detroit, *Western Distributers.*

H-B LIFE

The first cost of Life Guard
Equipment is Incidental

It is the Maintenance Cost that Counts!

Thirty years of experience in the manufacture of fenders and life guards has taught us that in order to keep maintenance cost down wheel guards should be manufactured strong—with a hair trigger operation, quick-acting and well built, made of good materials to bring down the cost of maintenance, not only in the upkeep of the guard, but in the efficiency of actually saving lives.

In the manufacture of H-B Life Guards and Providence Fenders we have made it a practice to include such materials as will stand severe service and operate with the utmost efficiency.

Our H-B Life Guard is being built not merely to cover the law as a wheel guard, but to save lives, operating automatically and instantaneously, and with the lowest cost of maintenance.

These features embodied in our equipments have given them their world-wide endorsement and life-saving record.

PROVIDENCE

THE CONSOLIDATED

Providence,

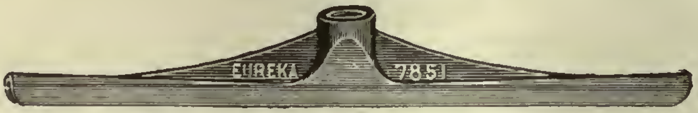
General Sales Agents: Wendell &

GUARDS

FENDERS

CAR FENDER COMPANY
Rhode Island
Mac Duffie Co., 61 Broadway, N. Y.

Eureka



Maintenance Material
Means Economy

Eureka Trolley Ears cast in one piece from a tough, durable alloy and the grooves are milled centrally, making soldering unnecessary.

Eureka Sleet Wheels. They are closely inspected, carefully finished and well balanced. They will give a maximum mileage with a minimum of wear and tear on the trolley wire.

Eureka Trolley Wheels are perfectly balanced, made of virgin metal and well finished. Correct design insures less wear on trolley wire and longer life of wheel.

Eureka Controller Fingers are made of hard drawn or drop forged copper, while the springs are stamped from special alloyed rolled phosphor bronze sheet. Fingers are interchangeable with all standard controllers.

**Commutators, Trolley Wheels, Trolley Ears,
Brush Holders, Sleet Trolley Wheels, Line
Material, Controller Fingers, Bearings.**

Manufactured by

THE EUREKA COMPANY
North East, Pennsylvania

120 Broadway, New York

Eclipse Trolley Retriever

ECLIPSE TROLLEY RETRIEVER
No. 7.
PATENTED & PAT. PEND'G
325 C
ECLIPSE RY. SUPPLY CO. CLEVELAND, OHIO.

The Retriever with half the parts. Standard on many leading Railways in Middle West. Try out a sample for sixty days at our expense. Pre-war price.

Also manufacturers of:

The Eclipse Fender
Acme Fender for Safety Cars
Eclipse Wheelguard
Eclipse Trolley Catcher

The Eclipse Railway Supply Company
4824 PAYNE AVENUE
CLEVELAND, O.

Kalamazoo
Trolley Wheels and Harps

Performance that *Improves Service*

EQUIP your cars with Kalamazoo Wheels and Harps and note the immediate *improvement in service.*

Kalamazoo Harps give perfect and continuous contact and are designed to permit quick and easy replacement of wheels. There is only one cotter pin to be taken out to remove the wheel.

Kalamazoo Wheels are made of virgin metal—pure lake copper. They are perfectly balanced for easy running and freedom from slippage.

Kalamazoo Wheels used with Kalamazoo Harps make the ideal current collector from the standpoint of long life and efficient service.

Write for illustrated catalog.
It will be mailed free upon request.

Star Brass Works
Kalamazoo, Mich.

Here We Are!

Here are our Convention exhibits. Though we cannot display the actual equipment itself at this year's meeting, we want to send you a sample to examine and try out yourself.

EARLL
Trolley Catchers and Retrievers

For Safety Cars

For City Cars

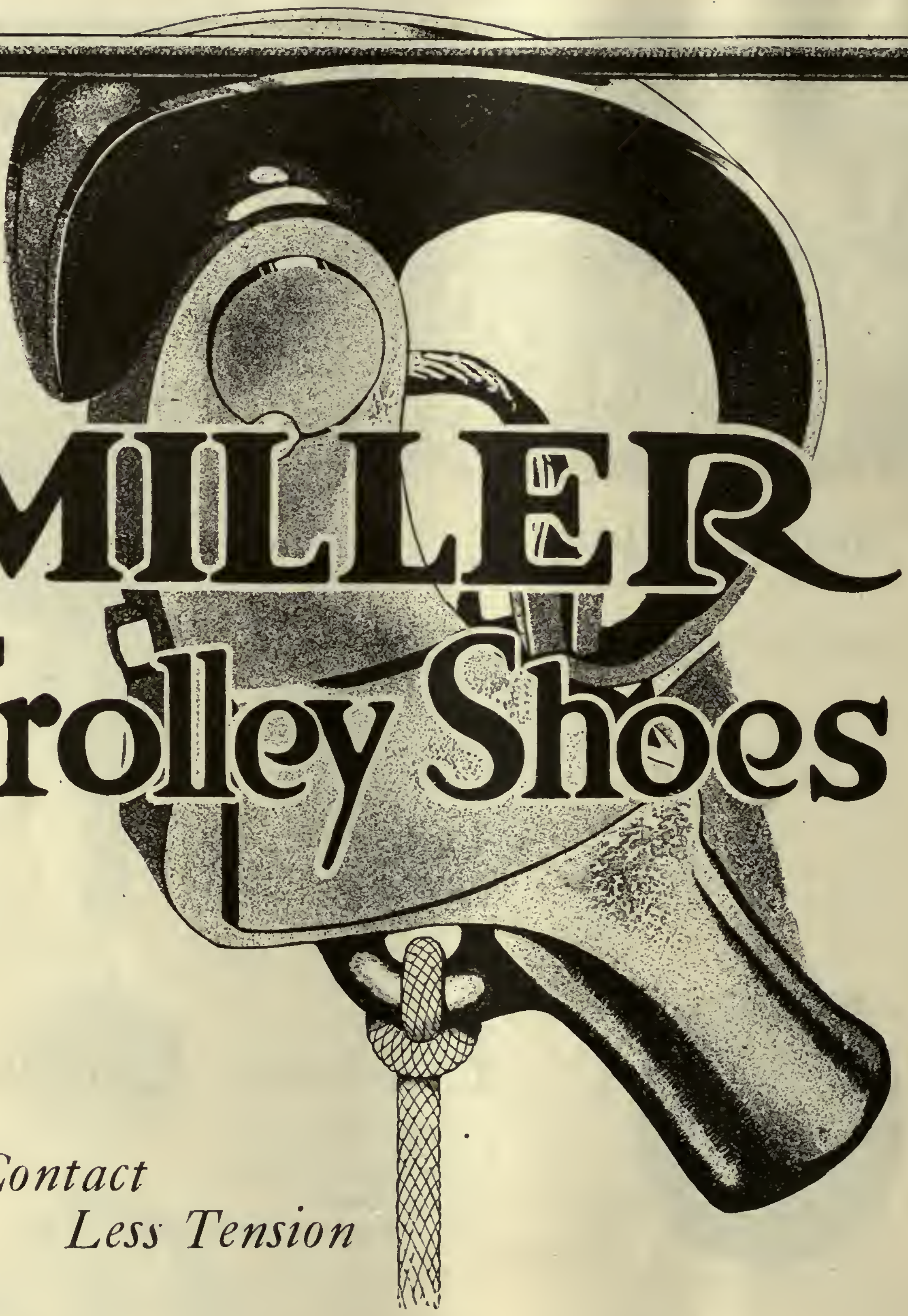
For Interurban Cars

FOUR FEATURES EARLL EXCLUSIVELY

1. Ratchet Wind
2. Emergency Release
3. Drum Check
4. Free Winding Tension Spring

These valuable mechanical improvements peculiar to the Earll, are combined with a simplicity and ruggedness of construction which makes this the most satisfactory and economical Retriever to use.

C. I. EARLL, YORK, PA.



MILLER
Trolley Shoes

More Contact
Less Tension

MILLER TROLLEY
Dorchester,

Alfred Connor
Denver, Col.

T. C. White & Co.
St. Louis, Mo.

F. F. Bodler
San Francisco, Cal.

For Both Interurban and City Service

INTERURBAN—Chicago, North Shore & Milwaukee R.R.

It's the Electrical Contact— not the Physical—that Counts!

Three-inch contact between a Miller Trolley Shoe and the wire means higher current—collecting capacity at higher speeds, less voltage loss and almost total elimination of jumping and arcing—all with about half the pressure needed to hold a trolley wheel to the wire.

Trolley Wire lasts as long with Miller Trolley Shoes as with trolley wheels. The steady, smooth, large-surface, light-pressure electrical contact of the Miller Trolley Shoe is easier on the wire than is a high pressure, arcing, pitting, jumping, rolling trolley wheel.

Miller Trolley Shoes will back up as easily as wheels.

Arrange with us for a trial on your road.

SHOE COMPANY

Mass.

W. M. McClintock
St. Paul, Minn.

S. I. Wailes
Los Angeles, Cal.

W. F. McKenney
Portland, Oregon

Increase Your Transportation Sales

By Increasing the Efficiency of Your Service

"U"

"V"

Keep Your Cars Always on Time by Using Bayonet Trolley Equipment

Bayonet Special Trolley Wheels

are made of the very highest grade of metal. No cheap alloys or old trolley wheels recast into new ones. All hand turned, insuring the greatest accuracy and balance. They are known all over the world for their superiority over other wheels, their economical and efficient service having been proved by competitive tests.

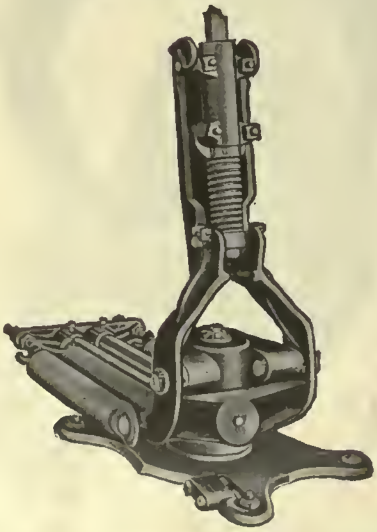
Bayonet Detachable Trolley Harps

are the only trolley harps with which you can change from wheel to sleet cutter or to a new wheel in TEN SECONDS. No tools required on top of the car; only your hand is necessary. All inspections, repairs, adjustments and lubricating are done at the work bench where they are better done. This eliminates unsatisfactory patchwork on top of car, insures perfect running trolleys and increases your trolley wheel mileage at least 33⅓%. The original and only practical Non-Arcing Harp made.

Bayonet Trolley Base with Detachable Pole Clamp

is the only trolley base made on which the trolley pole can be changed in 30 SECONDS and the wheel be in perfect alignment with the wire, and no tools required to do the job. Greatest flexibility of pole action is afforded by long extension springs and self-lubricated bushings in bearings, and the roller bearing swivel gives freedom to the rotary motion. It is so constructed that you get a uniform wire pressure at all angles of pole. All wearing parts are quickly and cheaply renewed, making the main parts of the base everlasting.

Perfect conductivity is afforded by sliding contact between turret and base plate. It saves your overhead, your wheels and your wire by its freedom of action.



Bayonet Sleet Cutters

have no superiors in cutting ice from the wire. If the ice can be removed the Bayonet will do the job. We have the rigid and semi-rotary types (the kind you can back up with) both of which are detachable and interchangeable with the wheel. Only ten seconds necessary to make the change from harp with wheel to one with sleet cutter.

All Bayonet equipment sold subject to approval. You must be satisfied or your money will be refunded. Begin now to practice economy by using the Bayonet.

BAYONET TROLLEY HARP CO.
Springfield, Ohio, U. S. A.

CHILLINGWORTH

One-piece Gear Case

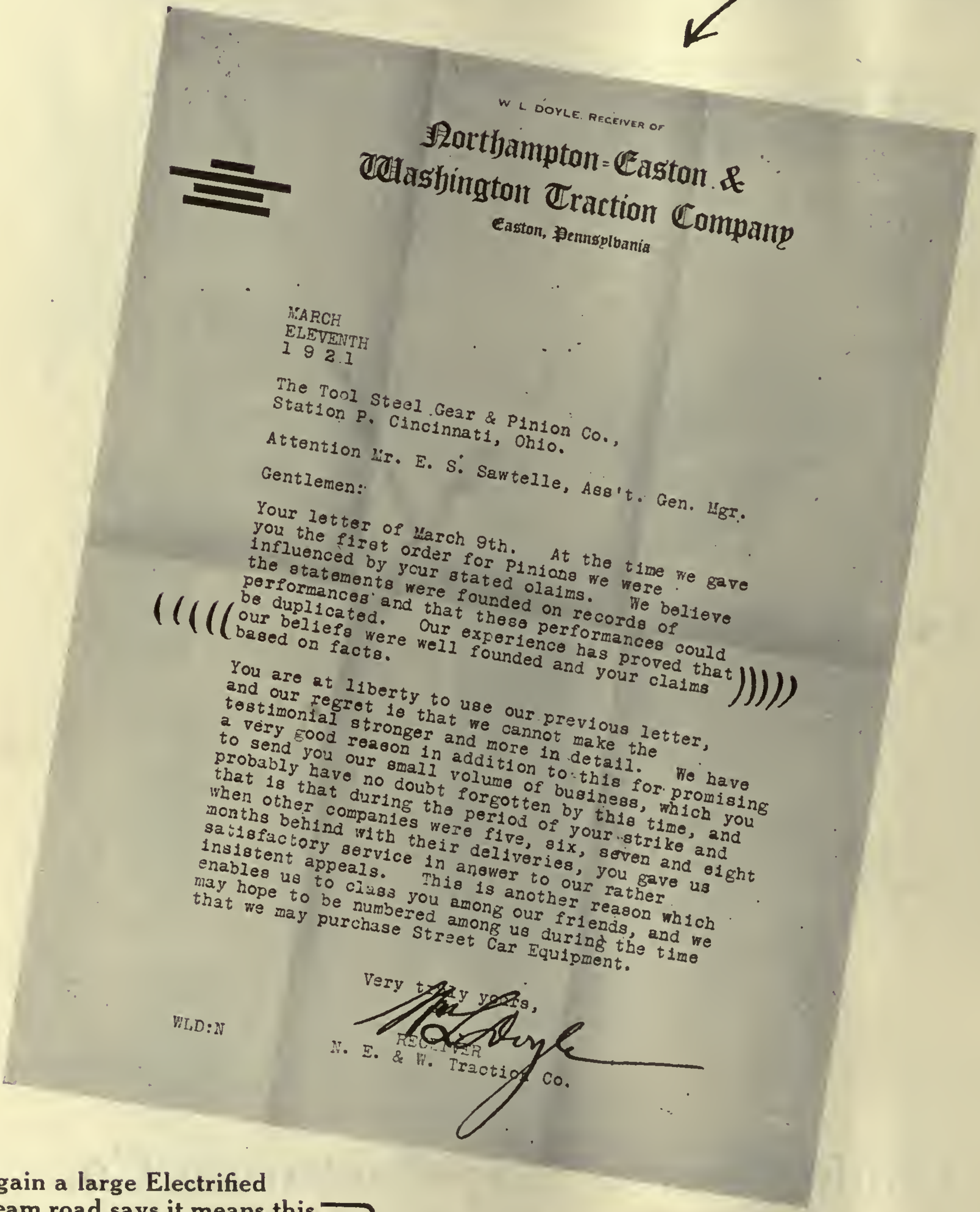
Chillingworth Manufacturing Co.

Jersey City, N. J.

Representatives:

H. F. Keegan & Co., Chicago, Ill.
Union Electric Co., Pittsburgh, Pa.
Railway Power & Eng. Corp., Ltd., Montreal, Can.
Allen General Supplies, Ltd., Toronto, Can.
P. W. Wood, New Orleans, La.

T. S. Q. means this



W. L. DOYLE, RECEIVER OF

Northampton-Easton & Washington Traction Company

Easton, Pennsylvania

MARCH
ELEVENTH
1 9 2 1

The Tool Steel Gear & Pinion Co.,
Station P. Cincinnati, Ohio.

Attention Mr. E. S. Sawtelle, Ass't. Gen. Mgr.

Gentlemen:

Your letter of March 9th. At the time we gave you the first order for Pinions we were influenced by your stated claims. We believe the statements were founded on records of performances and that these performances could be duplicated. Our experience has proved that our beliefs were well founded and your claims based on facts.

You are at liberty to use our previous letter, and our regret is that we cannot make the testimonial stronger and more in detail. We have a very good reason in addition to this for promising to send you our small volume of business, which you probably have no doubt forgotten by this time, and that is that during the period of your strike and when other companies were five, six, seven and eight months behind with their deliveries, you gave us satisfactory service in answer to our rather insistent appeals. This is another reason which enables us to class you among our friends, and we may hope to be numbered among us during the time that we may purchase Street Car Equipment.

Very truly yours,

Wm L. Doyle
RECEIVER
N. E. & W. Traction Co.

WLD:N

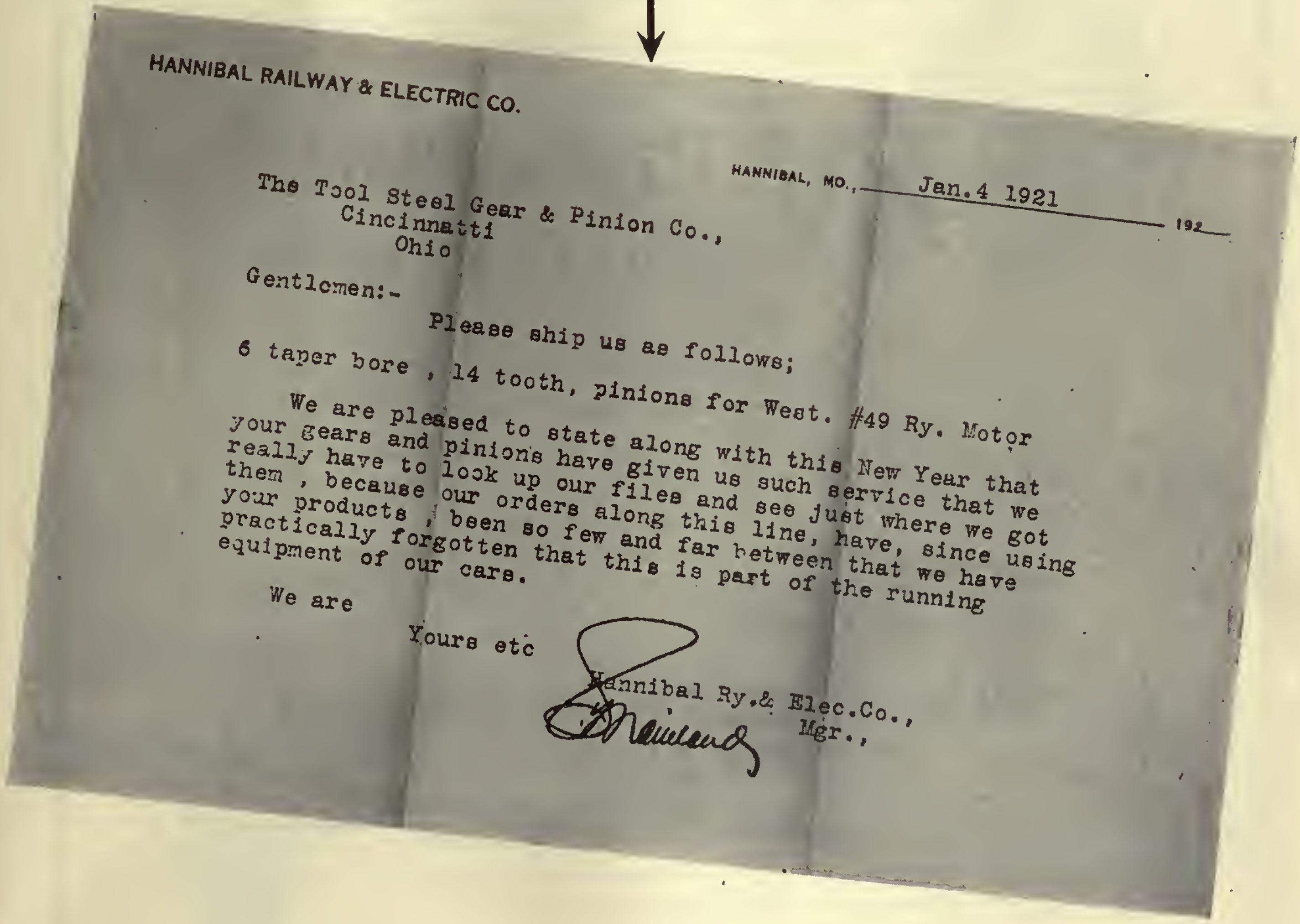
Again a large Electrified steam road says it means this

The heat treated pinions which came with our motors lasted only one-quarter as long as your "Tool Steel" pinions installed as replacements. Your material also eliminated our trouble from pinion breakage.

And one of our 74 English customers says it means this

With reference to the copy of the letter from the General Manager of a Colonial Tramway System, giving his experience of the life of the Tool Steel Gears and Pinions, I think our experience has been quite equal and perhaps even a little better. We are perfectly satisfied with our results of the use of this gear.

While Hannibal, Mo., says it means this



HANNIBAL RAILWAY & ELECTRIC CO.

HANNIBAL, MO., Jan.4 1921 192

The Tool Steel Gear & Pinion Co.,
Cincinnatti
Ohio

Gentlemen:-

Please ship us as follows;

6 taper bore , 14 tooth, pinions for West. #49 Ry. Motor

We are pleased to state along with this New Year that your gears and pinions have given us such service that we really have to look up our files and see just where we got them , because our orders along this line, have, since using your products , been so few and far between that we have practically forgotten that this is part of the running equipment of our cars.

We are

Yours etc

Hannibal Ry.& Elec.Co.,
Mgr.,

But get ALL the dope on—

"Tool Steel" Quality T. S. Q. "Tool Steel" Quality

from

Tool Steel Gear and Pinion Co.
Cincinnati, Ohio

TIGHTEN UP!

You won't have to when you
use automatic

S-W Brake Slack Adjusters

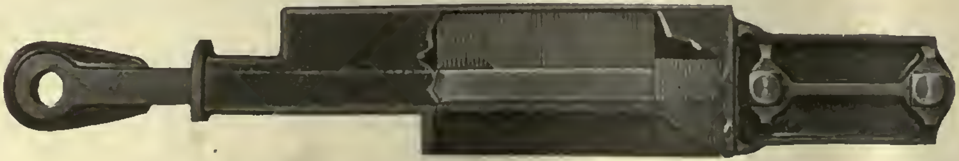
The ordinary method of adjusting brakes in the barn is unsafe. The human element is too far involved. And it lengthens the task of inspection and increases the expense of maintenance.

S-W Brake Slack Adjusters correct these evils and in addition impart longer life to your brake shoes by evenly distributing the wear at each point of contact.

Don't trust slack correction to the motormen and barn crew. Remove it altogether and be assured of dependable braking.

S-W Brake Slack Adjusters will fit any trucks. Try them.

SMITH-WARD BRAKE COMPANY
233 Thirty-seventh St., Brooklyn, N. Y.



Brakes:—Hand

How We Take Advantage of the Very First Second with

PEACOCK IMPROVED BRAKES

The eccentric chain winding drum and the automatic stop effectually and actually solve the problem of applying maximum force to the brake shoes as nearly instantly as the human mind and body can act.

The automatic stop positively prevents the brake from unwinding beyond the point of release and eliminates unnecessary chain winding on the next application. The eccentric drum so ingeniously applied in Peacock brakes gives maximum speed of chain winding on the large part of the drum as the motorman starts to turn the wheel, ending up with maximum leverage on the small part of the drum as the act of applying the brake is completed.

(*When it comes to safety cars*)

remember that you have a braking problem different from the ordinary. Safety car air brakes are now designed on the basis of a braking force equal to 140% of the weight of the car. Seventy or eighty passengers at 150 lbs. each almost equal the weight of the car itself, and prove too much for the ordinary brake to hold.

The Peacock Staffless brake is built to serve as a real emergency brake, one which will stop the overloaded car on a grade, if the air brake fails.

Some Quick Stop Tests

Brake tests on a 15 ton car loaded in a large eastern city showed that Peacock brakes would stop the car in 93 feet from a speed of 20 M.P.H. Other hand brakes from 124-128 feet.

NATIONAL BRAKE CO.

890 Ellicott Sq. Buffalo, N. Y.

Boyerize

To Get Big Savings

WE CAN'T carry mountains on our back, but like the squirrel in the fable we have cracked many maintenance nuts and can crack a lot more.

Before air-brake days, for instance, soft, untreated pins and bushings were held to be plenty good enough for the brake rigging.

But just as soon as the days of faster braking with air came, we began to develop pins and bushings that would stand the harder strains—and stand 'em longer than had been expected of handbrake stuff.

It was hard going for the Boyerizing idea at first, but time proved that Boyerized pins and bushings actually cost less per 100,000 miles than the untreated—and that they were infinitely safer.

Boyerization has reduced to the lowest possible limits the danger of pins sawing or shearing off between inspection periods, thus eliminating accidents due to the failure of brakes caused by lost motion, or worse still, by the loss of the pin entirely.

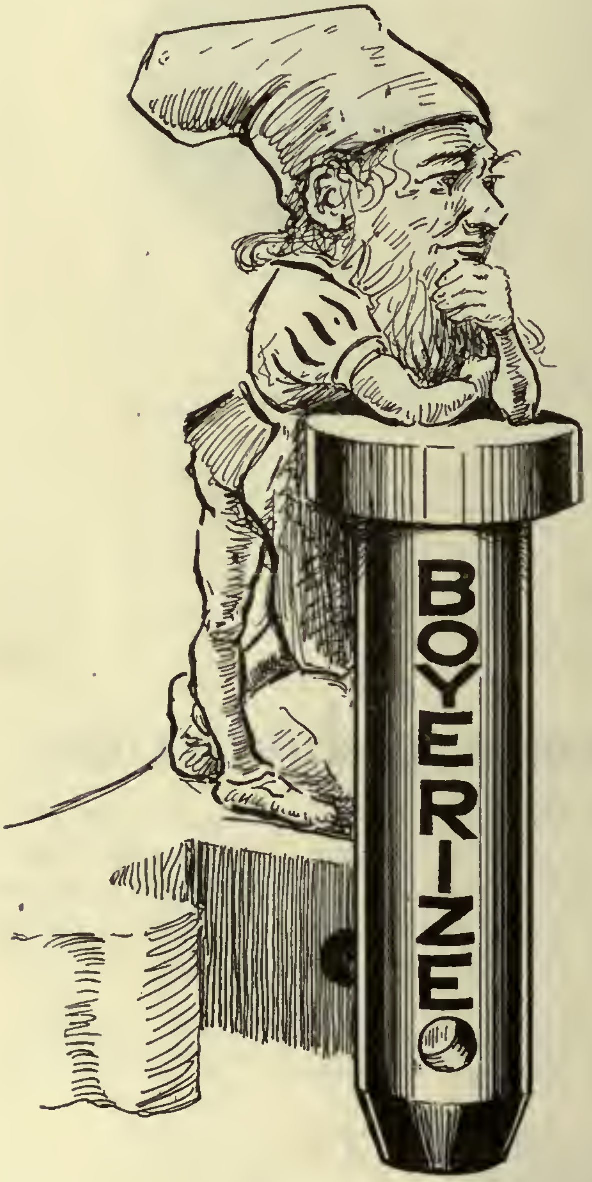
Other Boyerized

Keep the Cars

Boyerized Brake Hangers
Boyerized Brake Lever Pins
Boyerized Bushings

BEMIS CAR TRUCK CO.

BOYE



Boyerize

From Little Things!

TODAY the triumph of Boyerized pins and bushings is being duplicated with other Boyerized long-wear specialties in truck and brake-rigging.

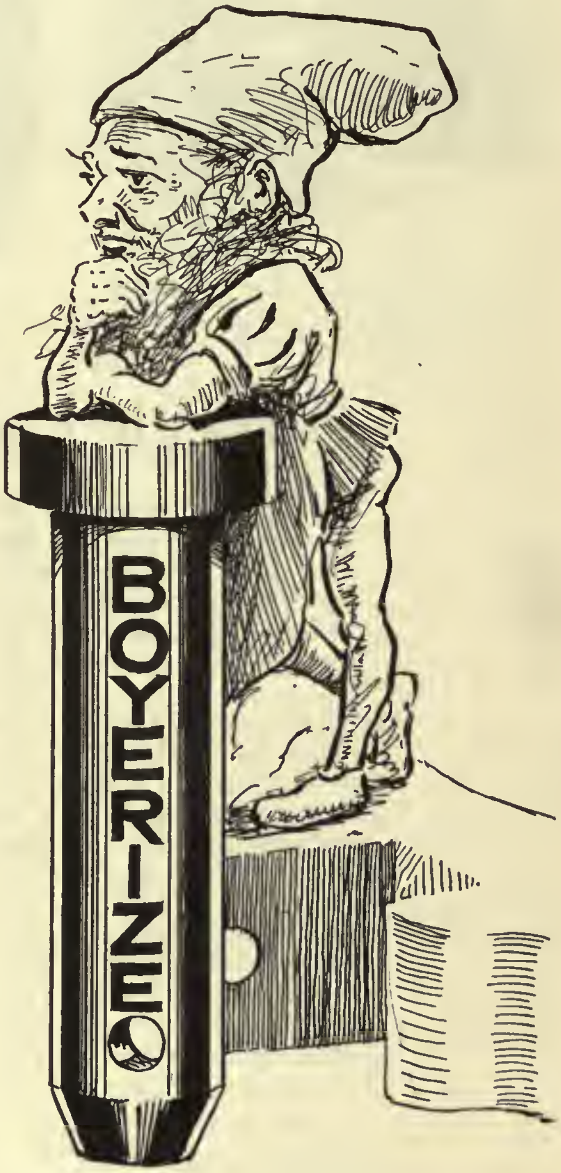
More particularly, our Stag Brand manganese brake-shoe heads.

Of course, they cost more to manufacture than the common steel kind, but four times greater life make their purchase well worth while, when you consider that every minute your cars are kept off of the pits is money in your purse.

The superb toughness, close grain and ductility of manganese steel makes it a perfect material for use in brake heads. They save the wheel tread, for example, because the manganese rubs or flows along the tread whereas steel would tend to gouge or cut.

Then, too, a badly fitting shoe in a steel head rapidly wears off at the toes and center of key lug. Manganese can stand the gaff.

Reasons enough why companies like the New York Municipal Railway specify Boyerized brake-shoe heads as standard from the start of service.



Specialties that

on the Road

Boyerized Wearing Plates
Boyerized Pins and Bushings for Door Fixtures
Boyerized Center Bearings.

SPRINGFIELD, MASS.

RIZE

Carnegie Complete Steel Service

The progress of electric railways is dependent to a great degree upon the progressiveness of the manufacturers of the products in railway use. Fifty-nine years of untiring effort to meet and to anticipate the needs of its customers places Carnegie Steel Company in a position to be of great service to electric railways. It manufactures a greater variety of steel sections than any other maker in the United States.

Among the products designed for electric railway use, Carnegie Wrought Steel Wheels deserve particular mention. A special process of forging and rolling results in a wheel of homogeneous structure, free from internal blow holes, so treacherous in cast material. They are well known to railway officials as the most suitable for all classes of service, the wheel for safety, economy and durability.

In addition, Carnegie Steel Company manufactures rails, cross-ties, bridge material, steel sheet piling, axles, gear blanks, car materials, tool steels, slag—in fact anything and everything within their limits the car builder, mechanic or engineer of maintenance of way needs. Many years of serving railways has brought to our engineers a wealth of experience that is at your service. Whatever your problem, track or rolling stock, take advantage of Carnegie Complete Steel Service.

Literature on any one or all of the products mentioned above is available at any Carnegie district office.

Carnegie Steel Company

General Offices: Carnegie Building, Pittsburgh, Pa.

1464

We are now prepared to furnish

WEIERBACH
Brake Shoes

Either M.C.B. or A.E.R.A. Standards

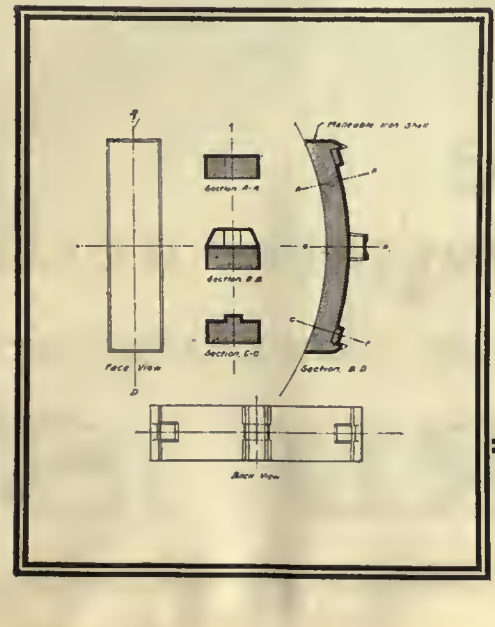
Superior in

Safety—Durability—Economy

The Weierbach Brake Shoe embodies all essential properties for most efficient operation. It is the best shoe available for passenger or freight service, either electric or steam railroad.

Will wear from 25% to 50% longer than other shoes with no greater initial cost. Avoids locked wheels, and eliminates screeching, chattering and jerking.

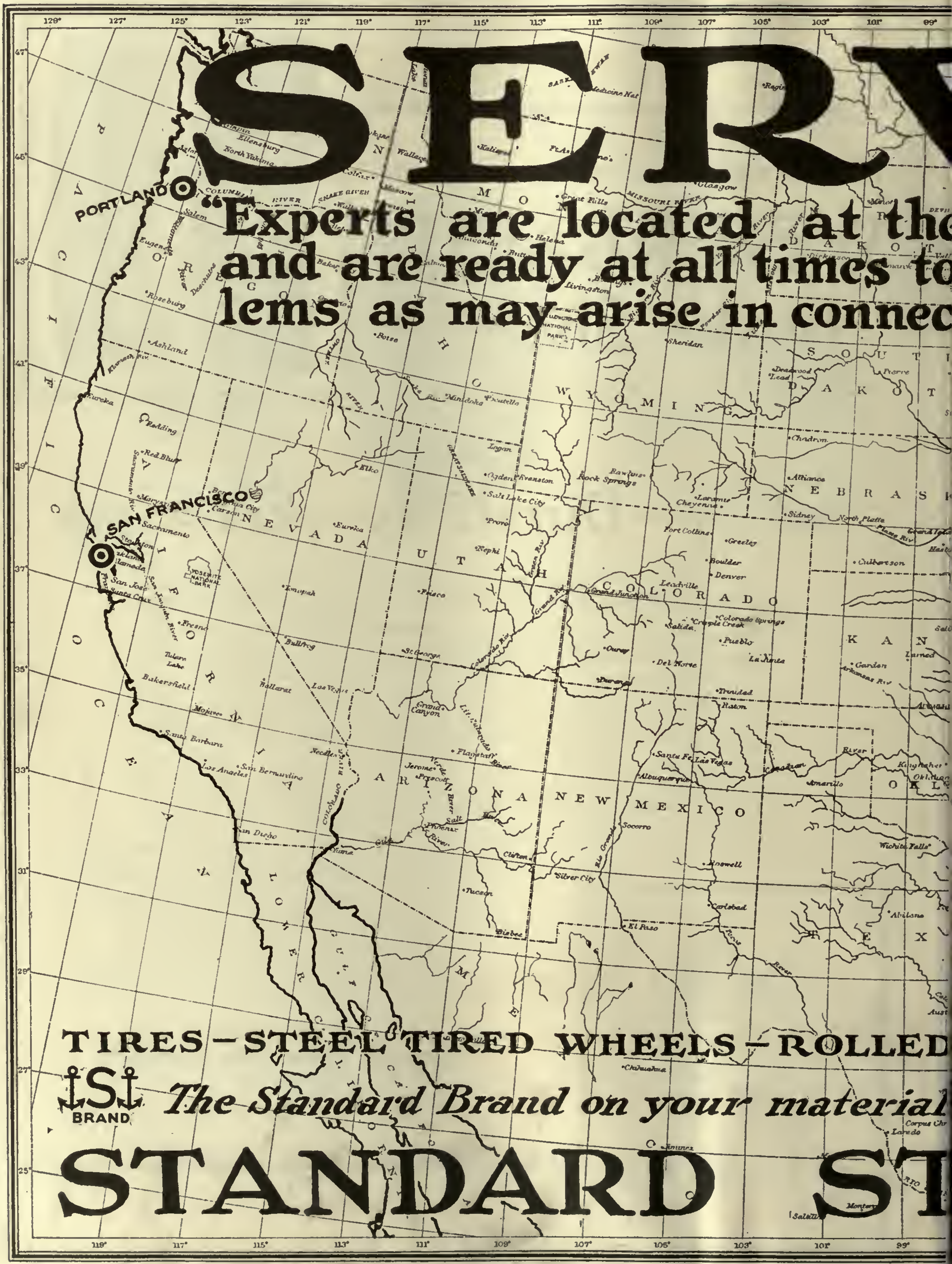
Will *not* break, crack or fall apart in service.



The greater smoothness of stops made with Weierbach Brake Shoes as compared with the usual iron or steel shoe is a strong point in selling a brand of transportation more agreeable to passengers.

Write for further information. We have some interesting data on comparative tests between Weierbach Brake Shoes and other kinds.

Weierbach Brake Shoe Company
Scranton, Pa.
Western Sales Agent
A. H. Hoffman, 315 American Bank Bldg., Los Angeles, Calif.



SERV

“Experts are located at th
and are ready at all times to
lems as may arise in connec

TIRES—STEEL TIRED WHEELS—ROLLED

S BRAND *The Standard Brand on your material*

STANDARD ST

VICE

ranch offices as indicated
discuss such mechanical prob-
on with our products”

WHEELS–FORGINGS–CASTINGS–SPRINGS

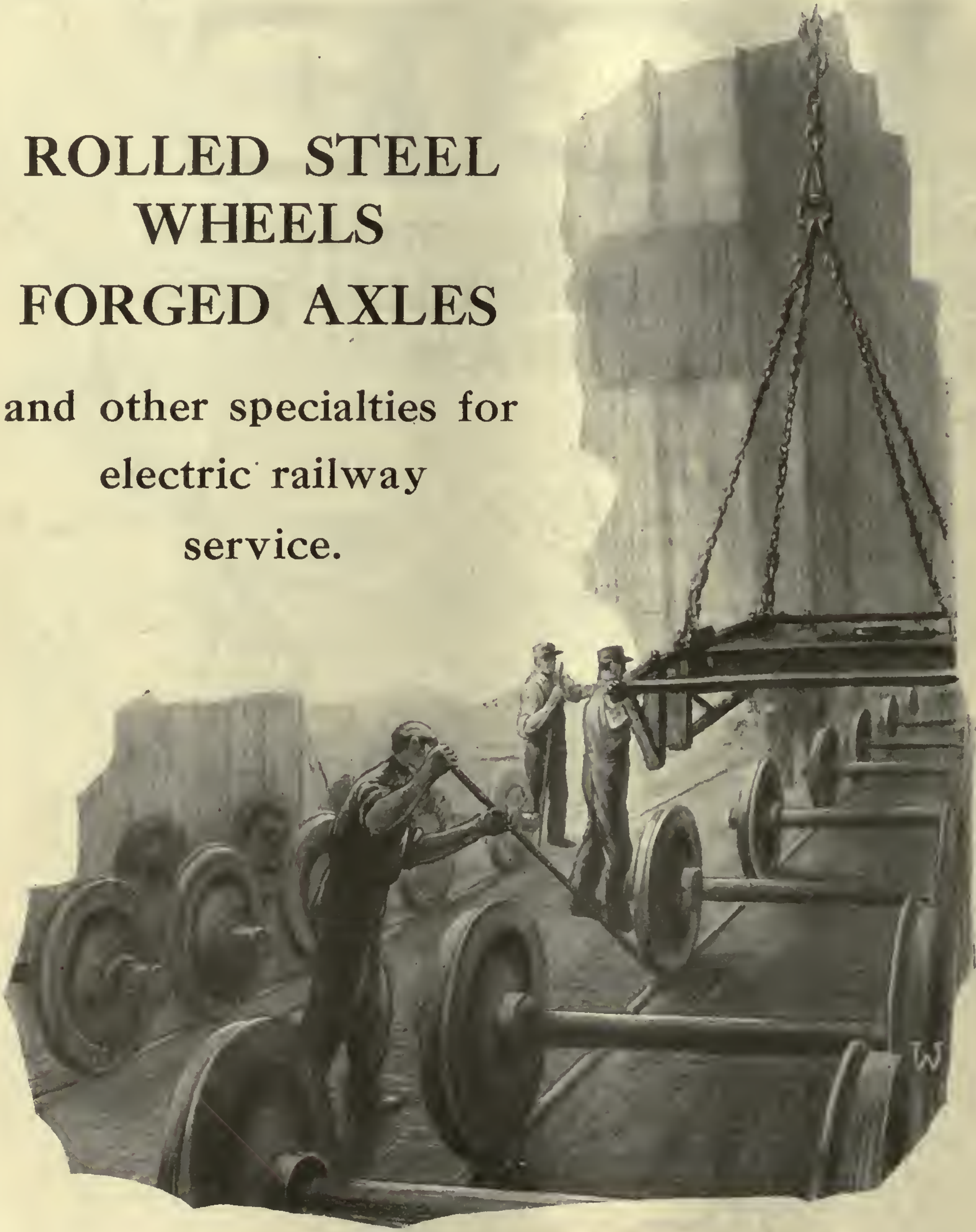
s an assurance of eventual economy

BRAND

EEL WORKS CO

ROLLED STEEL WHEELS FORGED AXLES

and other specialties for electric railway service.



MIDVALE STEEL AND ORDNANCE COMPANY
CAMBRIA STEEL COMPANY

General Offices:
Widener Building Philadelphia, Pa.

Atlanta
Boston
Chicago
Cincinnati
Cleveland
Detroit
New York

Philadelphia
Pittsburgh
San Francisco
Salt Lake City
Seattle
St. Louis
Washington, D.C.

SOLE EXPORTER OF OUR COMMERCIAL PRODUCTS CONSTECO CONSOLIDATED STEEL CORPORATION 25 BROADWAY, NEW YORK, U.S.A.

Winter's Icy Paw needn't weight down your Power plant

THE PETER SMITH

Forced-Ventilation

Hot-Air Car Heater

will relieve your generators of the terrific extra burden of vainly trying to keep your cars comfortable.

— Operating cost about a third that of the average electric system.

— Easiest heating system to install.

— Maintenance cost is low.

— Haulage cost lowest.

— Motor reliable and free from breakdown.

— Warms a "dead" car quicker than electric heaters.

— Is *guaranteed* to keep a car at 60 degrees in zero weather.

And we don't ask you to take our word for it. Write for the *proof*.

The Peter Smith Heater Co.

7595 Mt. Elliott Ave. **DETROIT, MICH.**

8642

V-K WHEELS-HARPS

PERFECT lubrication plus maximum conductivity is a combination which makes V-K Oilless Trolley Wheels lowest in ultimate cost and highest in net efficiency. Examine the construction of a V-K Wheel and you'll see why. Notice that it's properly balanced and mechanically perfect in finish. The metal from which it is made is especially tough but not hard. This means greater mileage and at the same time least detriment to overhead construction. The patented oilless (graphite and bronze gauze) bushing is non-insulating, heatproof, long-lived, easily interchangeable.

The V-K trolley wheel used with the V-K non-arcing harp will do more to reduce trolley maintenance cost (both wheel replacements and overhead repairs) than any other current collector on the market today.

A trial will convince you, as it has hundreds of other executives in charge of operation and maintenance.

MORE-JONES BRASS &

BUYERS of electric railway equipment have learned that low first cost usually means high ultimate cost—and *ultimate* cost is the only true measure of economy.

Take armature bearings, for example. The use of low cost, low quality bearings is bound to result in the constant laying up of cars for bearing renewals and for the rewinding of armature coils. High quality bearings eliminate all this expense and save the revenue that's lost while the cars are out of service.

More-Jones "Tiger" Bronze Axle and Armature Bearings are *high quality* bearings. Every day they are helping to reduce maintenance costs on some of the most progressive electric railroads in the country.

METAL CO., ST. LOUIS

Exide
BATTERIES

Below we exhibit illustrations of a few of the many ways in which electric railways are using Exide Batteries in giving the most efficient service to the public at lowest cost.

Storage Battery Car Service

Exide Batteries offer opportunity for most economical operation where the infrequency of service does not justify the cost of overhead construction and feeder system would not be justified.

High Voltage Locomotives

Direct current for operating compressor motors and auxiliary control apparatus during interruption of normal power supply is important. The Exide-Ironclad Battery has been furnished for many large electric locomotives.

Emergency Lighting Systems in Subways

Reasonable safety precautions demand auxiliary lighting systems in cars as well as stations. Darkness breeds panics. Exide Batteries are unexcelled for such emergency work.

Starting and Lighting Systems

Reliable batteries in large quantities are being required by the growing use of gasoline motor-buses, emergency vehicles and speedy automobiles for inspectors and officials. Exide Batteries are above all else—dependable!

Industrial Trucks

Efficiency demands labor-saving trucks for hauling loads around shops and storerooms and in baggage and trolley freight terminals. Exide Ironclad Batteries maintain practically constant voltage throughout discharge.

Low Voltage Control Multiple Unit Trains

On high voltage systems, a storage battery low-voltage master controller is often used. The low maintainence cost of Exide Batteries recommends them for this service.

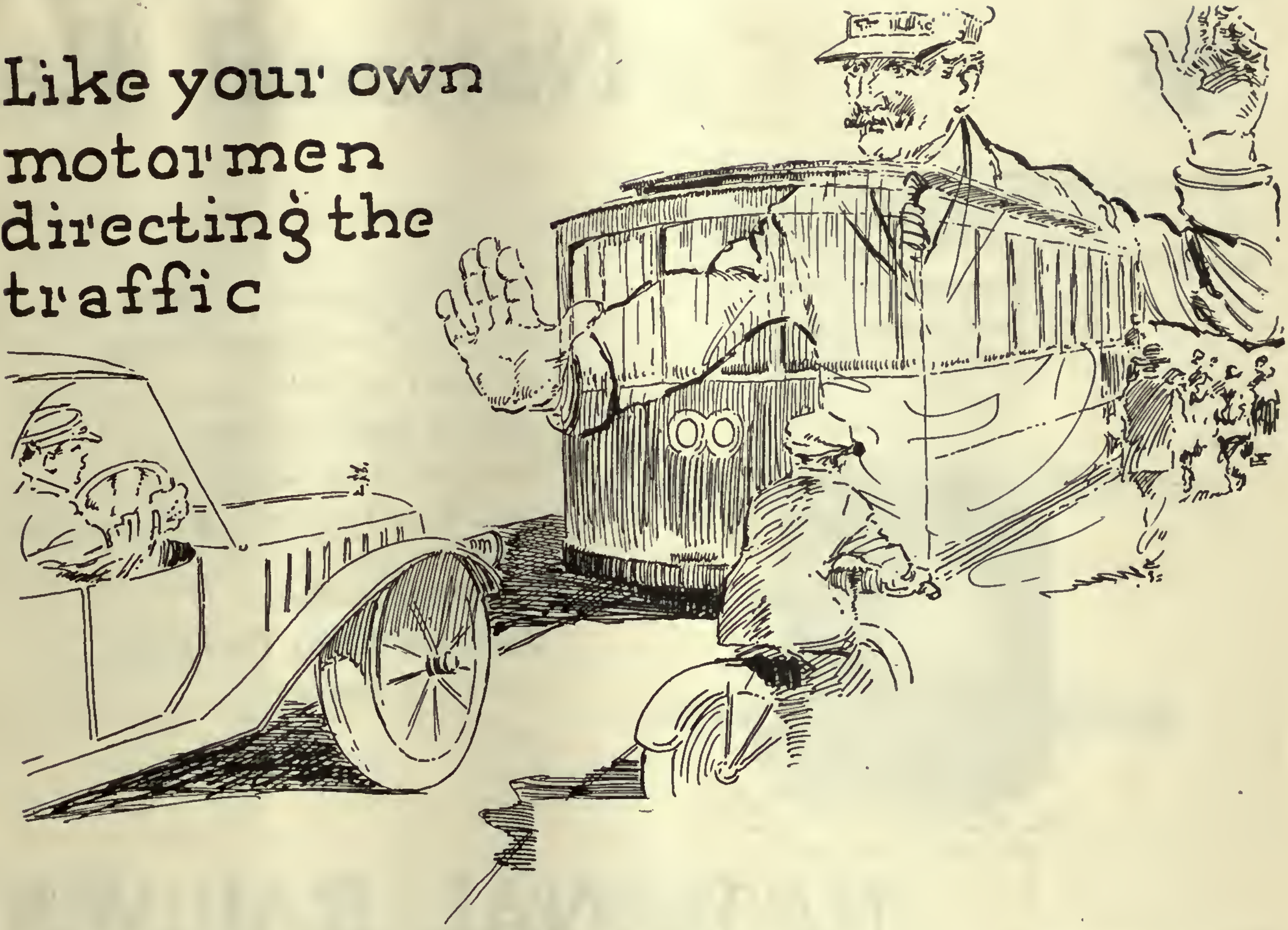
Also

For Power Plant Stand-by Service
For Isolated Telephone Lines
For Laboratory and Field Testing Sets

Send for bulletins giving full details

THE ELECTRIC STORAGE BATTERY CO.
Oldest and largest manufacturers in the world of Storage Batteries for every purpose
1888 PHILADELPHIA 1921
Branches in seventeen cities
Exide Batteries of Canada, Limited, 133-157 Dufferin St., Toronto, Canada.

Like your own motormen directing the traffic



IF THE motorman on every car could direct the movements of the car behind him—AND of the following trucks, wagons, etc.—you'll admit that rear-end accidents would be rare!

Well—HE CAN! He CAN control these cars and trucks and wagons—and without any effort on his part!

He can control them, simply by telling them—*flashing to them*—instantly, the message of just what his car is going to do (stop—proceed—coast or just go slow).

Nichols-Lintern Indicating Signals are doing it. N-L Signals on the rear end of each car operate—flash red, green or both—the instant the controller handle moves. They actually do help control the traffic by making it *intelligently* operated. And by doing that they also enable the following motorman to run his car without the false stops and starts that mean so much wear on motors, brakes and trucks. Full details on request.

—and motormen say it's a cinch to operate this sander

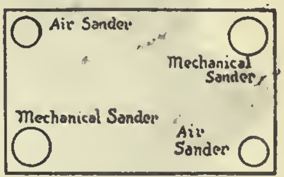
A cinch—sure! Just a simple pressure of the foot—and out jets the car-stopping sand. Yes—AIR can fail—but N-L Mechanical Sanders never fail. No car should be equipped ONLY with air brakes. The handbrakes should be backed up by N-L Sanders and the results will be certain.

Full details on request. Write us.

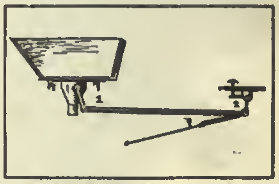
The Nichols-Lintern Co.

8404 Lorain Avenue **Cleveland, Ohio**

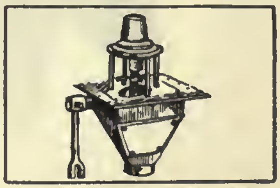
Typical installation showing a car that uses 50% as much sand as when not equipped with N-L Mechanical Sanders.



This is the way we recommend these Sanders be used—giving a properly balanced Sander Equipment.

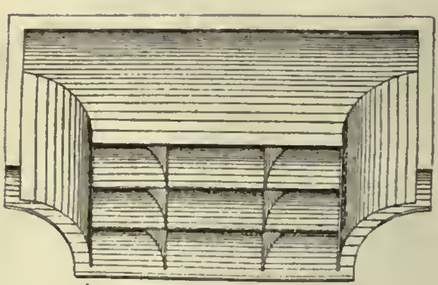


Here is all there is to it for the Safety Car—rapidly and cheaply installed.



N-L Mechanical Sand Valve, Patented. A slight pressure operates it and motormen say operation is a "cinch."

National Rail



Garland Ventilators

- Tool Steel Gears and Pinions
- Economy Power-Saving Meters
- Johnson Fare Boxes
- H. & W. Electric Heaters
- Anderson Slack Adjusters
- Drew Line Material and Railway Specialties
- Garland Ventilators
- Reversible Sliding Trolley Shoe
- Perry Side Bearings

"The Watchdog of Your Power"
Economy Electric Meters

NATIONAL RAILWAY

50 East 42nd Street,

B. A. Hegeman, Jr., President
Charles C. Castle, First Vice-President
Harold A. Hegeman, Vice-President and Treasurer

Washington Office: Munsey Bldg.

Boston Office:
Little Bldg.

Tool Steel Gear and Pinions

Johnson Fare Boxes

way Specialties

- Anglo-American Varnishes, Paints, Enamels, Surfacers and Shop Cleaner
- Hartman Centering Center Plates
- Pitt Pneumatic Sanders
- Genesco Paint Oils
- Dunham Hopper Door Device
- Flaxlinum Insulation
- Feasible Drop Brake Staff
- Kelly Brake Jaw
- National Safety Car Equipment Co.'s One-Man Cars
- Truck and Car Repair Parts

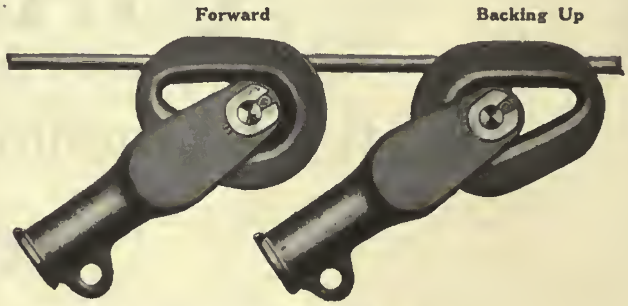
Drew Line Material

APPLIANCE COMPANY

New York City

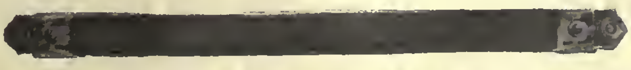
Fred C. J. Dell, Secretary
W. C. Lincoln, Manager of Sales and Engineering

Chicago Office:
(Hegman-Castle Corp.)
Fisher Bldg.



Reversible Sliding Trolley Shoe

H & W Electric Car Heater
Panel Type



The Cutler-Hammer Heating Unit

When you buy, build or rebuild cars

Specify
AGASOTE
Trade Mark
for roofs, headlining and wainscoting
and
PANTASOTE
Trade Mark
for curtains and upholstery

THE PANTASOTE COMPANY
11 Broadway, New York
Peoples Gas Bldg., Chicago, Ill.
751 Monadnock Bldg., San Francisco, Cal.

A-E-R-A
Standard Patterns
Brake Heads
Brake Shoes

Reinforced Diamond "S" Shoes Are the Best Type to Use

While we urge the adoption of AERA Standards as the most economical practice, we can make prompt shipment of Brake Shoes from any pattern—

STANDARD
or
NON-STANDARD

American Brake Shoe & Foundry Co.
30 Church Street, New York

332 So. Michigan Ave.,
CHICAGO

Chattanooga
TENN.

DIFFERENTIAL

Twenty-nine of the leading electric railways have adopted DIFFERENTIALS as their standard work car equipment

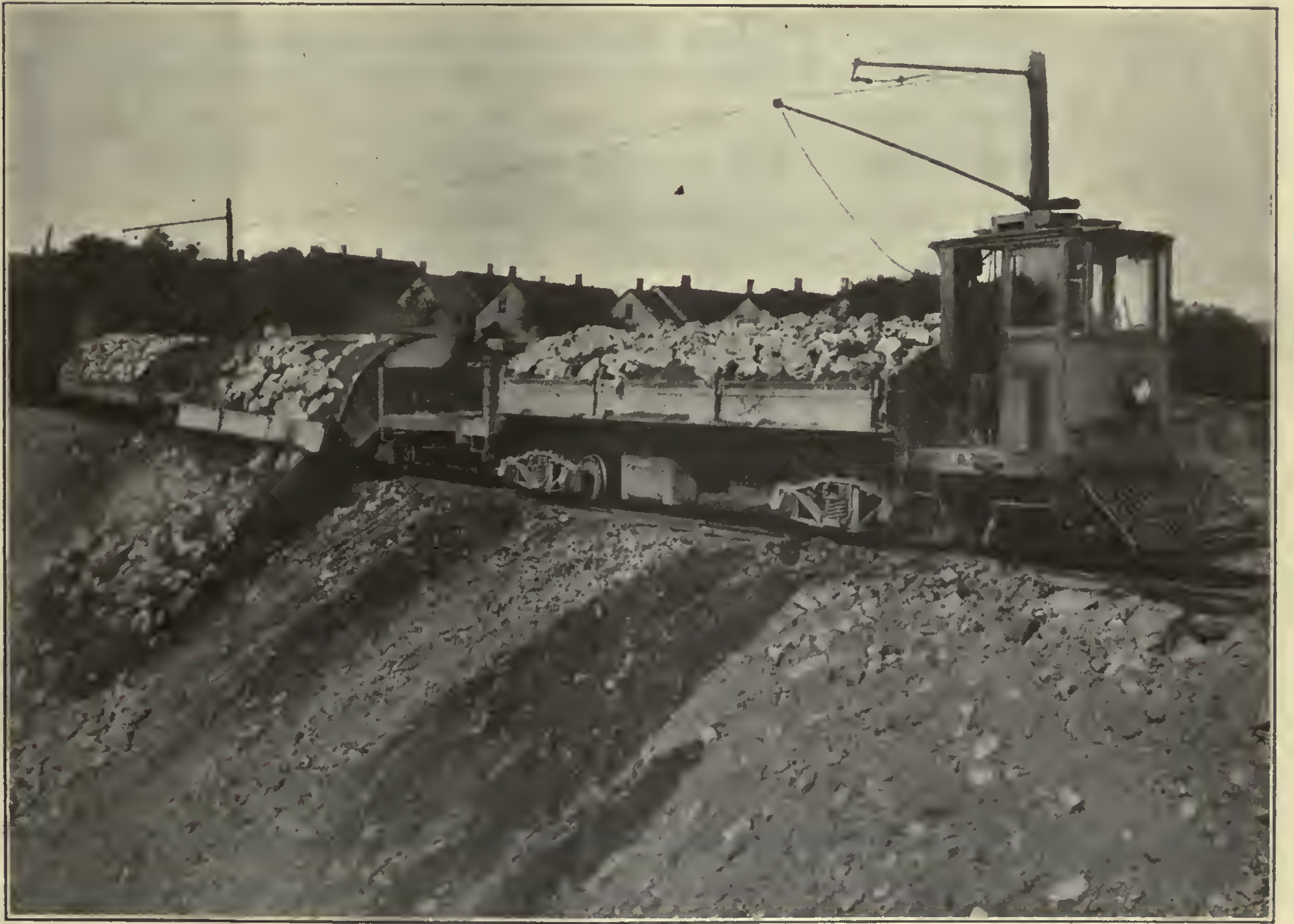
THE DIFFERENTIAL

Findlay,

UTILITY CARS

Automatic unloading, easy loading, one man operation, and a legion of other money and time saving features explain DIFFERENTIAL popularity

Ask some of the Twenty-nine companies operating them



STEEL CAR CO.

Ohio

LET US HELP YOU

THE SAFETY CAR has proven itself in service to be one of the most effective means of increasing "Sales of Transportation."

More than five thousand of these one-man safety cars are producing increased net revenue for practically four hundred companies. The railways in three of the four largest cities in the United States have operated them under varying conditions, and each one will place more in service as they are completed in the near future.

The elimination of jitney competition, increased traffic, and economies in platform labor, power and maintenance have followed their introduction time after time on properties from the largest to the smallest. We will gladly present the facts and figures of actual operation.

For over three years we have furnished cars for cash or through the *Car Trust Certificate* plan.

THE LEASING PLAN is now added to these. Under this arrangement a property may be equipped with safety cars without the financial burden of the initial payment required under the car trust plan. Regular payments of a part of the earnings of the cars apply on the lease and the ultimate purchase.

Buy, lease or convert,
and increase earnings.
soon pay for safety cars

NATIONAL SAFETY CAR

ST.

OUR ORGANIZATION

Geo. H. Tontrup, President
Nic. LeGrand, Sales Manager
C. W. Rhoades

E. T. Bronenkamp, Vice-President
Thos. Simons

Eastern Representatives:
National Railway Appliance Co.
(Hegeman & Castle)
50 East 42nd Street, New York

Southeastern Representatives:
E. A. Thornwell,
Candler Bldg.
Atlanta, Ga.

SELL TRANSPORTATION

CONVERSION of existing equipment is recommended to those properties which are depriving themselves of the economies to be effected through one-man operation, because they have single and double truck cars which are still serviceble.

Let us furnish estimates of the cost of conversion and contract to do the work in your shops or our own. The rebuilt cars will be equipped with complete safety appliances.

SUPPLIES—We furnish Malleable Iron and all other repairs and replacements for your equipment. Let us serve you.

THE TRACKLESS TROLLEY for extensions is rapidly coming into popularity in this country, as it has been for similar service in several European countries for years.

Our staff is equipped to assist you in surveying the possibilities of the Trollibus for your extensions and to supply the necessary rolling stock.

As in the past, we are always ready to be of service, whether in appearing before legislative committees, city councils, state commissions or labor organizations to spread the gospel of the Safety Car—

Or to facilitate the purchase or conversion of cars.

reduce operating expenses
Your daily savings will
purchased today.

& EQUIPMENT COMPANY

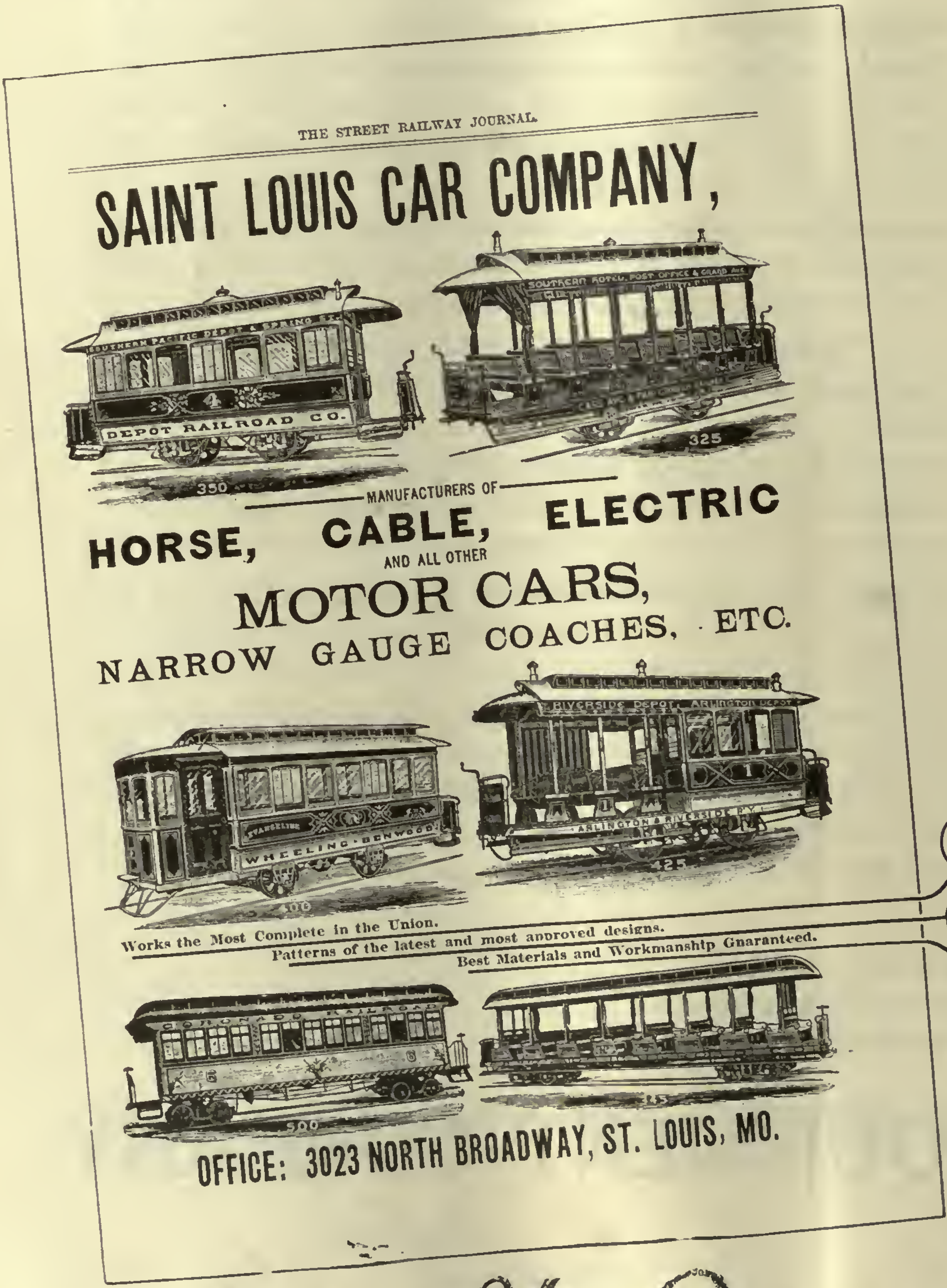
LOUIS

WE REPRESENT

Cincinnati Car Company	Safety Cars
Hale & Kilburn Corporation	Car Seats
Keyes Products Company	Nevasplit Headlinings

Only Real Quality Cars ca

Our Advertisement of
Quality Cars in September 1889


SOUTHERN PACIFIC DEPOT & SPRING ST
4
DEPOT RAILROAD CO.
350
SOUTHERN HOTEL, POST OFFICE & GRAND AVE
325
WHEELING BENWOOD
300
RIVERSIDE DEPOT ARLINGTON DEPOT
ARLINGTON & RIVERSIDE RY.
425
CORONADO RAILROAD
6
500

THE STREET RAILWAY JOURNAL.

SAINT LOUIS CAR COMPANY,

MANUFACTURERS OF

HORSE, CABLE, ELECTRIC

AND ALL OTHER

MOTOR CARS,

NARROW GAUGE COACHES, ETC.

Works the Most Complete in the Union.

Patterns of the latest and most approved designs.

Best Materials and Workmanship Guaranteed.

OFFICE: 3023 NORTH BROADWAY, ST. LOUIS, MO.

①

②

③

St Louis

St. Louis,

be Advertised Permanently

Quality Cars
of Today

Consistent Quality Policy

Thirty-two years of QUALITY performance and Quality Shop Production. A continuous and consistent record of achievement. Our slogan—then, now and always—"QUALITY."

The three strong points in our 1889 advertising are true today, as they were then. Our plant and equipment is as complete, modern and efficient as any in the country. We always have patterns of the latest and most improved designs, notably our Quality Safety Cars and Trackless Trolleys. And the claim, "Best Materials and Workmanship," then a statement supported only by our own word, is now the established reputation of St. Louis Quality Cars.

Car Company

Missouri

McGUIRE-CUMMINGS MANUFACTURING CO.
CHICAGO

CITY AND INTERURBAN CARS
AND TRUCKS, SAFETY CARS
COMBINATION AND WORK CARS
SNOW SWEEPERS, ELECTRIC
LOCOMOTIVES

EVERY type of car for America's Electric Railways—from the light weight safety car to the heavy interurban built for high speed—is produced in the shops of the McGuire-Cummings Manufacturing Co.

For more than twenty years this organization has specialized in the manufacture of cars and trucks for the country's leading Electric Railways. Performance records in practically every state in the union testify to the strength, safety, efficiency and long life of rolling stock built by this Company.

Our Engineering Department is at your service whenever the question of new equipment comes up for discussion.

McGUIRE-CUMMINGS MANUFACTURING CO.
GENERAL OFFICES
111 WEST MONROE STREET
CHICAGO, ILL.

ACKLEY BRAKES
Found The World Over

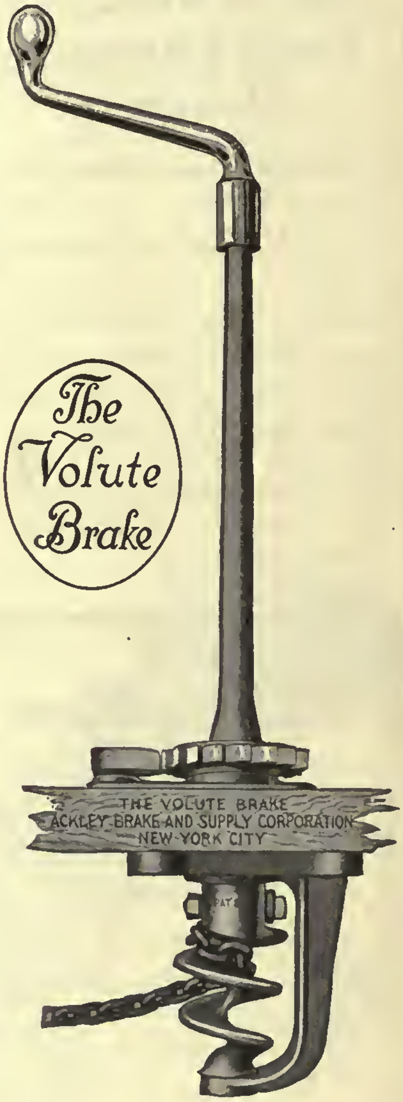
The Volute Brake

VOLUTE

The Volute Brake

AT LAST!—

The High Power *Gearless* Staff Brake



The Volute Brake

Equivalent in power to a 3 to 1 ratio geared brake—but less than one-half its weight and size.

Quick take-up—positive in release.

Unequalled for simplicity and ruggedness.

Adapted to all types of equipment.

Our type 201 weighs 13 lbs. and is ideal for safety cars.

The price of adequate braking by means of the Volute will astonish you.

SEND FOR BULLETIN F

Investigate the Volute on the cars of the Atlantic City and Shore Railroad when at the Convention

ACKLEY NO-STAFF TRADE MARK BRAKE

ACKLEY BRAKE & SUPPLY CORPORATION
G·S·ACKLEY & COMPANY. REPRESENTATIVES
50 Church Street, New York, U.S.A.
Agencies throughout the World
Cable address "Acklebrake"

ACKLEY 2-E TRADE MARK BRAKE
THE ACKLEY COMPANIES U.S.A.

THE CLEVELAND FARE BOX COMPANY

CLEVELAND, OHIO

Manufacturer's Distributors for

Rapid Ready Lever Change Makers

A Wonderful Improvement in Change Makers.

Quickly Adjusted to Any Rate of Fare.

Ejectors Cannot Jam or Sag from Weight of Coins.

Ejector Springs Will Be the Last Part of Changer to Break or Wear Out, As They Are Wide and Flat and Made of Special Non-Corrosive Metal.

Manufacturers and Distributors of

Cleveland Fare Boxes

They Meet
All Modern
Fare Collection Conditions

Manufactured and
Distributed
in Canada
by the

Canadian Cleveland
Fare Box Co., Ltd.
Preston, Ontario

Midwestern Agents for

Arthur Power Saving Recorders

Thousands
in
Successful
Use.

Let us tell you why.

"Their Men Always Look So Neat and Tidy"

This expression goes a long way in helping you get more car fares. Can the people you serve and the people you should serve say this about your platform men?

Neatness and uniform tidiness of employees stimulates a psychological reaction that is always beneficial to the employing corporation. It arouses public good will and associates your name with wholesome, progressive thoughts.

You should strenuously oppose the nondescript uniform. Select a regulation uniform and then choose from the *"American"* line the *Cap, Badge, Buttons* and *Arm Decorations* that set it off to the best advantage.

Caps—Badges—Buttons—Embroidered Embellishments—Metal Checks—Punches

American Railway Supply Co.
134-136 Charles Street, New York

Service Value

Scrap value for idle used machinery or surplus material is not enough. If it can be used by others they will pay *service value* for it.

The Searchlight Section will find buyers for you.

¶ Manufacturers who accept used equipment in part payment for new can dispose of it promptly by advertising in the Searchlight Section.

¶ Machinery used in manufacturing and displaced by other equipment can be sold at a fair price by advertising it in the Searchlight Section.

¶ Wide-awake dealers, agents or representatives can be secured through little Searchlight "Want" ads.

¶ Manufacturing sites, partners, help, capital—anything that anybody in the industrial field is likely to have for sale or exchange for something else—can be located or disposed of through the Searchlight Section.

The costs of putting your wants in this projector is very slight, whether for a man, for a job, or for a market.

- 0056

The Searchlight Section

Have You Received Your Copy of Our Catalogue with Revised Price List?

If not, write us, and we will send it.

Prices are reduced, but the value of Triggerlock Reversible Controller Fingers is greatly increased, as we are now able to obtain a special Phosphor Bronze as strong and durable as a steel spring. The fingers, being all spring in action, give a delicate yet definite contact not possible with the short spring used on ordinary fingers. For this reason the controller is easier to operate.

The Reversible Tip takes all the wear. Each tip will outwear four ordinary fingers, and after both sides of the tip are worn out a new tip is snapped on in a moment, without removing the finger from the controller.

Specify them on your next requisition, and reduce maintenance costs.

G.E.K.-10
Showing
Tip unlocked

This is all you scrap
when both sides of tip
are worn out.

RUSSELL MFG. CO.
814-18 Bath Avenue, Niagara Falls, N. Y.
11 Pinewood Avenue, Toronto, Canada

The Woods
Security "LOCK TILL" Fare Box
of Special Design for
SAFETY CARS
Weighs but 19 Pounds

Takes Less Room on Platform and Is Simplest Design of any Good Fare Box. Made from Highest Grade of Aluminum Phosphor Bronze and Cold Rolled Sheet Steel

Each box is provided with two large tills to facilitate auditing and handling of collections.

The inspection plate is large, light and well exposed, and must be dumped before the till can be removed from the box.

We invite rigid comparison with all other boxes on design, quality of workmanship, light weight and ease of repair with standardized parts. Lowest in first cost and lowest in maintenance. Only one moving part. Takes tickets, transfers, tokens and cash. Double lock; two keys required. Safe.

Woods Fare Boxes have been in service for 10 years and are now standard on approximately 75 different properties.

DESIGNED, DEVELOPED AND OWNED BY OPERATING RAILWAY OFFICIALS.

Also made in capacity sufficient for heaviest city service.

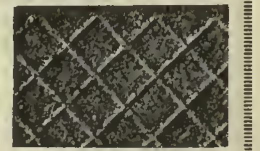
WOODS FARE BOX CO., Decatur, Ill., U.S.A.
Sales Agents:
STANLEY SMITH, Hanna Bldg., Cleveland. L. E. GOULD, Old Colony Bldg., Chicago

THE MOST SUCCESSFUL MEN IN THE ELECTRIC RAILWAY INDUSTRY READ THE
ELECTRIC RAILWAY JOURNAL
EVERY WEEK

Heating and Ventilating

Let us demonstrate to you how we can heat and ventilate your cars at the lowest possible cost.

The Cooper Heater Company
Carlisle, Pa.



FERALUN Anti-Slip Treads
Car Steps
Floor Plates
Station Stairs
Door Saddles, etc.

AMERICAN ABRASIVE METALS CO.
50 Church St., New York City

It's iron and emery cast together

Bound Brook Trolley Wheel Bushings
Give Longer and Better Service

THERE are more Bound Brook (Oil-less) Trolley Wheel Bushings in use today than all other makes combined. That is because Bound Brook Bushings, by virtue of their construction, invariably outlast all other types.

All Genuine Graphited Oil-less Bushings have always been made at Bound Brook, U. S. A.

BOUND BROOK OIL-LESS BEARING COMPANY
Bound Brook, New Jersey *Detroit Office: 1723 Ford Bldg.*

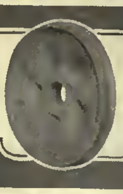
Car Seating, Broom and Snow Sweeper Rattan, Mouldings, etc.

AMERICAN RATTAN & REED MFG. CO.
Brooklyn, N. Y.

AMERICAN means QUALITY
RATTAN SUPPLIES OF EVERY DESCRIPTION

HORNE MANUFACTURING CO.
Mercer and Colgate Streets, Jersey City, N. J.

Hand Brakes—Air Purifiers for Compressors—Lighting Fixtures—Electric Vibrating Bells—Thermostats—Switches, Receptacles and Plugs—Junction Boxes, Portables and Reflectors.

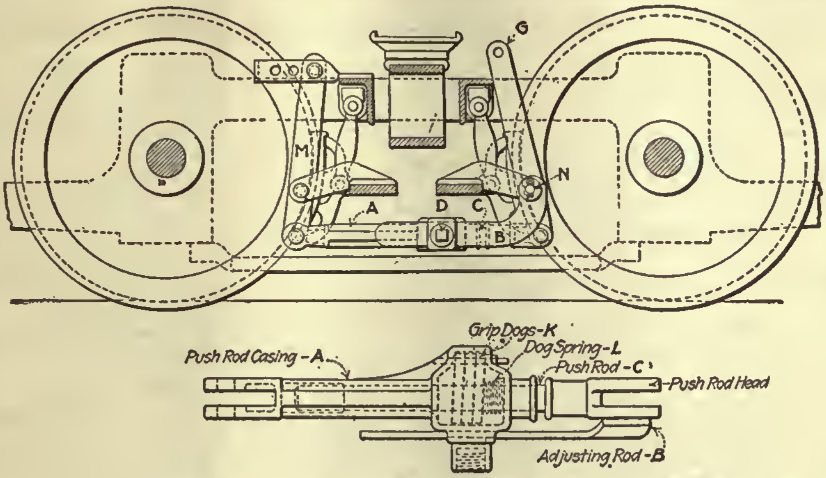


DAVIS STEEL WHEELS
Standard for Electric Railway Service
AMERICAN STEEL FOUNDRIES
1100 McCormick Building Chicago

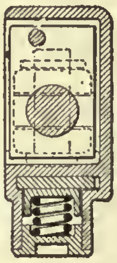
STUCKI SIDE BEARINGS

A. STUCKI CO.
Oliver Bldg.
Pittsburgh, Pa.

Brake-Rigging Continuously Taut with—



Details of the Gould Type Slack Adjuster as applied to an Electric Car Truck



GOULD Slack Adjuster

Specified by United Railways & Electric Co., of Baltimore, for latest safety cars.

How often you notice a motorman running with brakes partially set up, due to over-anxiety to be sure that all the slack is out of rigging. The waste of power and wear on brake shoes in such cases is appalling.

Remove the incentive to run with brakes set up, by installing Gould Automatic Slack Adjusters, which keep the brakes always ready for instant response to the operator's effort. Incidentally you will save materially on shop expense, which occurs from the necessitv of frequent manual adjustments of brake rigging when it is not taken care of by Gould automatic adjusters.

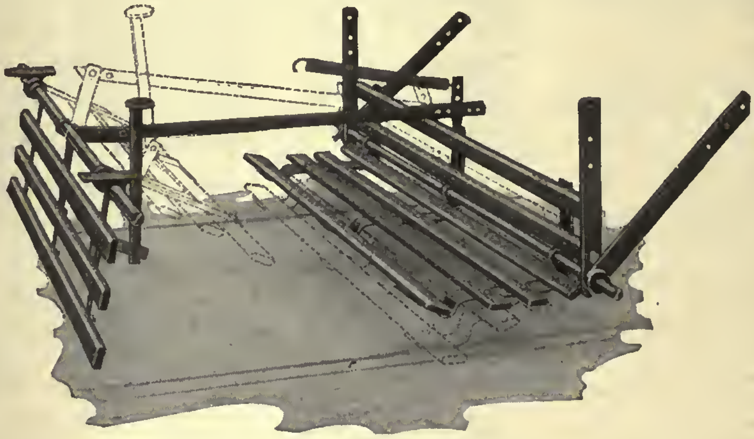
Write today for further information

GOULD COUPLER COMPANY

30 East 42nd St., New York City **Works: Depew, N. Y.** **The Rookery, Chicago, Ill.**

Announcing—

The **ROOT Spring Life Guard**



THE life guard is one piece of equipment that must perform unfailingly in every emergency. Otherwise it is worse than useless—so much added weight plus the hazard of uncertain protection in case of accident.

The Root Spring Life Guard is all that the name implies—a *Real Life Guard.* It is made of the best materials obtainable—springs of high carbon, oil tempered steel—castings of ample strength to take care of every emergency—carefully assembled and inspected—built thorough to withstand the shocks and strains of the hardest kind of service.

To introduce the new Root Spring Guard we will ship one car equipment on approval to any Street Railway or Car Builder in the United States or Canada.

ROOT Spring Scrapers

Root Spring Scrapers are now standard equipment on 90% of all Safety Cars operated in this country, as well as on thousands of two man cars of every type. If your property is not already equipped with Root Spring Scrapers, write for complete data.

ROOT SPRING SCRAPER CO.
Kalamazoo, Michigan

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Aftercoolers
Ingersoll-Rand Co.

Air Circuit Breakers
Roller-Smith Co.

Air Compressors, Used
Brearley, H. P.
Foster, H. M.

Air Compressors
Ingersoll-Rand Co.

Air Receivers
Ingersoll-Rand Co.

Air Motors
Ingersoll-Rand Co.

Air Purifiers
Horne Mfg. Co.

Ammeters
Roller-Smith Co.
Western Elec. Co.

Anchors, Guy
Drew Elec. & Mfg. Co.
Electric Service Sup. Co.
Ohio Brass Co.
Track Specialties Co.
Western Electric Co.
Westinghouse E. & M. Co.

Angle Bar Bolters
Ingersoll-Rand Co.

Armature Shop Tools
Electric Service Sup. Co.

Automatic Safety Switch Stands
Ramapo Iron Works

Automobiles and Buses
Brill Co., The J. G.
Day-Elder otors Co.
Duplex Truck Co.
International Motor Co.
Republic Truck Sales Corp.
Vreeland Motor Co., Inc
White Co., The

Axles
Bemis Car Truck Co.
Cambria Steel Co.
Midvale Steel & Ord. Co.
Taylor Electric Truck Co.
St. Louis Car Co.
Standard Steel Works

Axles, Car Wheel
Bemis Car Truck Co.
Brill, The J. G.
Carnegie Steel Co.
Standard Steel Works Co.
Westinghouse E. & M. Co.

Axle Straighteners
Columbia M. W. & M. I. Co.

Axles Industrial & Plantation Car
Ramapo Iron Works

Axles, Street Car
National Ry. Appliance Co.

Babbitt Metal
More-Jones Br. & Metal Co.

Babbitting Devices
Columbia M. W. & M. I. Co.

Badges and Buttons
American Ry. Supply Co.
Electric Service Sup. Co.
Internat'l Register Co., The

Bankers and Brokers
Coal & Iron National Bank

Batteries, Dry
National Carbon Co.
Western Elec. Co.

Batteries, Storage
Elec. Storage Battery Co.
Western Elec. Co.

Bearings and Bearing Metals
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Drew Elec. & Mfg. Co.
Eureka Co.
General Electric Co.
More-Jones Br. & Metal Co.
Post & Co., E. L.
St. Louis Car Co.
Taylor Elec. Truck Co.
Westinghouse E. & M. Co.

Bearings, Center and Roller Side
Stucki Co., A.

Bearings, Oilless, Graphite, Bronze and Wood
Bound Brook Oil-less B. Co.

Bells and Gongs
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.
St. Louis Car Co.
Western Elec. Co.

Benders, Rail
Niles-Bement-Pond Co.
Railway Track-work Co.
Track Specialties Co.
Western Elec. Co.

Bending Apparatus
Railway Track-work Co.

Boilers
Babcock & Wilcox Co.

Boiler Tubes
Cambria Steel Co.
National Tube Co.
Midvale Steel & Ord. Co.

Boilers, Used
Brearley, H. P.
Brenholtz, Roy
Foster, H. M.

Book Publishers
McGraw-Hill Book Co., Inc.

Bond Testers
American Steel & Wire Co.
Electric Service Sup. Co.
Rail Welding & Bonding Co.
Roller-Smith Co.

Bonding Apparatus
American Steel & Wire Co.
Electric Ry. Improv. Co.
Electric Service Sup. Co.
Ohio Brass Co.
Rail Welding & Bonding Co.

Bonds, Rail
American Steel & Wire Co.
Copper Clad Steel Co.
Drew Elec. & Mfg. Co.
Electric Ry. Improv. Co.
Electric Service Sup. Co.
General Electric Co.
Ohio Brass Co.
Rail Welding & Bonding Co.
Railway Track-work Co.
Westinghouse E. & M. Co.

Boring Tools, Car Wheel
Niles-Bement-Pond Co.

Boxes—Junction and Outlet
National Metal Molding Co.

Braces, Rail
Track Specialties Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, etc.)
Bates Exp. Steel Truss Co.
Drew Elec. & Mfg. Co.
Electric Ry. Equip. Co.
Electric Service Sup. Co.
Hubbard & Co.
Ohio Brass Co.
Western Elec. Co.

Brake Adjusters
Gould Coupler Co.
Hamilton & Hansell, Inc.
National Ry. Appliance Co.
Smith-Ward Brake Co.
Westinghouse Tr. Br. Co.

Brake Shoes
Amer. Br. Shoe & Fdry. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.
Taylor Elec. Truck Co.
Weierback Brake Shoe Co.

Brakes, Brake Systems and Brake Parts
Ackley Br. & Supply Corp.
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
Horne Mfg. Co.
Johns-Manville, Inc.
National Brake Co.
St. Louis Car Co.
Safety Car Devices Co.
Taylor Elec. Truck Co.
Westinghouse Tr. Br. Co.

Brake Regulators
Hamilton & Hansell, Inc.

Brass & Bronze Products
Amer. Copper Prod. Corp.

Brooms, Track, Steel or Rattan
Amer. Rattan & Reed Mfg. Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
Morganite Brush Co., Inc.
National Carbon Co.
Nelson Co., I. R.
U. S. Graphite Co.
Western Elec. Co.
Westinghouse E. & M. Co.
Western Elec. Co.

Brushes, Graphite
National Carbon Co.

Brush Holders
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.

Bus Bars
Amer. Copper Prod. Corp.

Bus Seats
Heywood-Wakefield Co.

Bus Bodies
Paterson Vehicle Co.

Buses, Motor
Day-Elder Motors Corp.
Duplex Truck Co.
International Motor Co.
Republic Truck Sales Corp.
Trackless Trans. Co.
Vreeland Motor Co., Inc.

Bushings
Nat'l Metal & Molding Co.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.

Bushings, Graphite and Wooden
Bound Brook Oil-less B. Co.

Cables (See Wires and Cables)

Cambric Tapes, Yellow and Black, Varnished
Irvington Varnish & Ins. Co.

Cambric, Yellow and Black, Varnished
Irvington Varnish & Ins. Co.
Nelson Co., I. R.

Carbon Brushes (See Brushes, Carbon)

Car Lighting Fixtures
Electric Service Supplies Co.

Car Panel Safety Switches
Cambria Steel Co.
Midvale Steel & Ord. Co.
Westinghouse E. & M. Co.

Cars, Dump
Differential Steel Car Co.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
National Ry. Appliance Co.
National Safety Car & Equipment Co.
Ramapo Iron Works
St. Louis Car Co.
Transit Equipment Co.

Cars, Push
Wason Mfg. Co.

Cars, Used
Electric Equipment Co.
Sherwood, E. C.
Transit Equipment Co.
Wendell & MacDuffie.

Cars, Self-Propelled
Electric Storage Battery Co.
General Electric Co.

Castings, Brass, Composition or Copper
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Drew Elec. & Mfg. Co.
Clark Elec. & Mfg. Co.
Eureka Co.
More-Jones Br. & Metal Co.

Castngs, Gray Iron and Steel
Amer. Br. Shoe & Fdy Co.
American Steel Foundries
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Standard Steel Works Co.
St. Louis Car Co.

Castings, Malleable and Brass
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Catchers and Retrievers, Trolley
Earll, C. I.
Eclipse Ry. Supply Co.
Electric Service Sup. Co.
Ohio Brass Co.
Wood Co., Chas. N.

Ceiling, Car
Pantasote Co.

Chisel and Chisel Blanks
Ingersoll-Rand Co.

Chairs
Heywood-Wakefield Co.

Change Carriers
Cleveland Fare Box Co.

Checks, Employees
Amer. Ry. Supply Co.

Ceilings, Plywood, Panels
Haskelite Mfg. Corp.

Circuit Breakers
Automatic Reclosing Circuit Breaker Co.
Cutter Co.
General Electric Co.
Roller-Smith Co.
Western Electric Co.
Westinghouse, E. & M. Co.

Clamps and Connectors for Wires and Cables
Anderson Mfg. Co., A. & J. M.
Clark Elec. & Mfg. Co.
Dossert & Co.
Electric Ry. Equip. Co.
Electric Service Sup. Co.
Eureka Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Western Electric Co.
Westinghouse E. & M. Co.

Clamps, Guard Rail
Track Specialties Co.

Cleaners and Scrapers — Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Ohio Brass Co.
Root Spring Scraper Co.
Western Electric Co.

Cleats
Nat'l Metal Molding Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

Code Signal Systems
Western Elec. Co.

Coil Banding and Winding Machines
Columbia M. W. & M. I. Co.
Comstock Mfg. Co.
Electric Service Supplies Co.
Western Electric Co.

Coils Armature & Field
Columbia M. W. & M. I. Co.
Comstock Mfg. Co.
General Electric Co.
Nelson Co., I. R.
Transit Equipment Co.
Westinghouse Elec. & M. Co.

Coils, Choke and Kicking
Electric Service Sup. Co.
General Electric Co.
Nelson Co., I. R.
Westinghouse E. & M. Co.

Coin-Counting Machines
Electric Service Sup. Co.
Internat'l Register Co., The
Johnson Fare Box Co.

Commutator Slotters
Electric Service Sup. Co.
General Electric Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Elec'l Mfg. Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Mica Insulator Co.
Nelson Co., I. R.
Westinghouse E. & M. Co.
Western Elec. Co.

Compressors, Air
Allis-Chalmers Mfg. Co.
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Tr. Br. Co.

Compressors, Gas
Ingersoll-Rand Co.

Compromise Joints
Track pecialties Co.

Concrete Products
Massey Concrete Prod. Corp.

Concrete Reinforcing Bar
Cambria Steel Co.
Midvale Steel & Ord. Co.

Condensers
Allis-Chalmers Mfg. Co.
General Electric Co.
Ingersoll-Rand Co.
Schutte & Koerting Co.
Westinghouse E. & M. Co.

Condensers, Used
Brearley, H. P.
Brenholtz, Roy
Foster, H. M.

Condensor Papers
Irvington Varnish & Ins. Co.

Conduits, Interior
National Metal Molding Co.

Conduits, Flexible
Tubular Woven Fabric Co.

Connectors, Solderless
Dossert & Co.
Frankel Connector Co.
Westinghouse E. & M. Co.

Conduits, Underground
Western Elec. Co.

Connectors, Trailer Car
Electric Service Supplies Co.

Controller Fingers
Eureka Co.
Russell Mfg. Co.

Wendell & MacDuffie Company

61 Broadway

New York

Manufacturers' Sales Representatives
and Exporters

Electric and Steam
Railway Equipment

WHAT AND WHERE TO BUY

Controllers or Parts
Allis-Chalmers Mfg. Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Nelson Co., I. R.
Transit Equipment Co.
Westinghouse E. & M. Co.

Controller Regulators
Electric Service Sup. Co.

Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.

Converters, Rotary
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Conveyors, Belt
Portable Machinery Co.

Conveyors, Coal and Ash
Portable Machinery Co.

Conveyors, Portable
Portable Machinery Co.

Conveying and Hoisting Machinery
Columbia M. W. & M. I. Co.

Conveying and Hoisting Machinery (Used)
Brenholtz, Roy

Copper Products
Amer. Copper Prod. Corp.

Capper Wire
Amer Copper Prod. Corp.
Anaconda Copper Min. Co.
Copper Clad Steel Co.
Nelson Co., I. R.

Cord, Bell, Trolley, Register, etc.
Brill Co., The J. G.
Electric Service Sup. Co.
Internat'l Register Co., The
Roebling's Sons Co., J. A.
Samson Cordage Works
Silver Lake Co.

Cord Connectors and Couplers
Electric Service Sup. Co.
Samson Cordage Works
Wood Co., Chas. N.

Cord, Portable Electric
Tubular Woven Fabric Co.

Core Drills
Ingersoll-Rand Co.

Couplers, Car
Amer. Steel Foundries
Brill Co., The J. G.
Gould Coupler Co.
Ohio Brass Co.
Van Dorn Coupler Co.
Westinghouse Tr. Br. Co.

Cranes
Allis-Chalmers Mfg. Co.
Niles-Bement-Pond Co.

Creepers, Anti-Rail
Track Specialties Co.

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossings, Manganese
Indianapolis Switch & Frog Co.

Crossing Signals (See Signals, Crossing)

Crossings, Frog and Switch
Wharton, Jr., & Co., Wm.

Crossings, Tracks (See Track, Special Work)

Crushers Rock
Allis-Chalmers Mfg. Co.

Culvert Pipe, Concrete
Massey Concrete Prod. Corp.

Culverts
Armco Iron Culvert & Flume Mfrs. Assn.

Curtains and Curtain Fixtures
Brill Co., The J. G.
Electric Service Sup. Co.
Pantasote Co.
St. Louis Car Co.

Cutouts
Johns-Manville, Inc.

Dealers' Machinery
Archer & Baldwin
Brearley, H. P.
Brenholtz, Roy
Electric Equipment Co.
Foster, H. M.
Karaski-Friedman Co.
Transit Equipment Co.

Derailing Devices (See also Track Work)
Ramapo Iron Works
Track Specialties Co.
Wharton, Jr., & Co., Wm.

Destination Signs
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.

Detective Service
Wish Service, P. Edward

Dispatching Systems (Telephone)
Western Elec. Co.

Dogs, Lathe
Williams & Co., J. H.

Door Operating Devices
Con. Car Heating Co.
Nat'l Pneumatic Co., Inc.
Safety Car Devices Co.

Doors and Door Fixtures
Brill Co., The J. G.
General Electric Co.
Hale & Kilburn Co.

Doors, Folding Vestibule
Nat'l Pneumatic Co., Inc.

Doors and Shutters, Fireproof
Kinnear Mfg. Co.

Doors, Steel Rolling
Kinnear Mfg. Co.

Draft Rigging (See Couplers)

Drills and Hammers, Elec.
Western Elec. Co.

Drills, Metal & Wood Boring
Ingersoll-Rand Co.

Drills, Rail
Track Specialties Co.

Drills, Rock
Ingersoll-Rand Co.

Drills, Track
American Steel & Wire Co.
Electric Service Sup. Co.
Ingersoll-Rand Co.
Niles-Bement-Pond Co.
Ohio Brass Co.

Dryers, Sand
Electric Service Sup. Co.

Ears
Eureka Co
Western Elec. Co.

Earth Boring & Pole Setting Machines
Western Elec. Co.

Electrodes, Carbon
Indianapolis Switch & Frog Co.

Electrodes, Steel
Indianapolis Switch & Frog Co.

Electric Specialties
Nat'l Elec. Specialty Co.

Electrical Wires and Cables
Amer. Copper Prods. Corp.
Amer. Electrical Works
American Steel & Wire Co.
Nelson Co., I. R.
Roebling's Sons Co., J. A.

Energy Saving Devices
Arthur Power Saving Recorder Co.
Cleveland Fare Box Co
Economy Electric Devices Co.

Engineers, Consulting, Contracting and Operating
Allison & Co., J. R.
Archbold-Brady Co.
Arnold Co., The
Beeler, John
Byllesby & Co., H. M.
Clark & Co., Mgr., Corp., E. W.
Day & Zimmermann
Engel & Hevenor
Feustel, Robert M.
Ford, Bacon & Davis
Gould, L. E.
Hemphill & Wells
Holst, Englehardt W.
Jackson, Walter
Kelly, Cooke & Co.
Nelson Co., I. R.
Parsons, Klapp, Brinkerhoff & Douglas
Richey, Albert S.
Robinson Co., Dwight P.
Sanderson & Porter
Sangster & Matthews
Smith & Co., C. E.
Stone & Webster
White Engineering Corp., The J. G.

Engines, Gas, Oil or Steam
Allis-Chalmers Mfg. Co.
Ingersoll-Rand Co.
Westinghouse E. & M. Co.

Engines, Gas, Oil and Steam (Used)
Foster, H. M.
Brearley, H. P.

Fan Motors
Western Elec. Co.

Fare Boxes
Cleveland Fare Box Co.
Economy Elec. Devices Co.
Johnson Fare Box Co.
National Ry. Appliance Co.
Ohmer Fare Register Co.
Woods Fare Box Co.

Feed Water Heating
Schutte & Koerting Co.

Feed Water Heaters (Used)
Brearley, H. P.
Brenholtz, Roy
Foster, H. M.

Fence
Cambria Steel Co.
Midvale Steel & Ord. Co.

Fences, Woven Wire and Fence Posts
American Steel & Wire Co.

Fenders
Wood Co., Chas. N.

Fenders and Wheel Guards
Brill Co., The J. G.
Cleveland Fare Box Co.
Con. Car Fender Co.
Eclipse Ry. Supply Co.
Electric Service Sup. Co.
Root Spring Scraper Co.
Western Elec. Co.

Fibre and Fibre Tubing
Continental Fibre Co.
Johns-Manville, Inc.
Westinghouse E. & M. Co.

Field Coils (See Coils)

Filters, Water
Scaife & Sons Co., Wm. B.

Fire Alarm Systems
Western Elec. Co.

Fire Extinguishers
Johns-Manville, Inc.

Flaxlinum Insulation
National Ry. Appliance Co.

Flexible Conduit
Tubular Woven Fabric Co.

Floodlights
Electric Service Sup. Co.
Western Electric Co.

Flooring Compositior
Amer. Mason Safety Tread Co.
Johns-Manville, Inc.

Floor Plates
Amer. Abrasive Metals Co.

Forgings
Cambria Steel Co.
Carnegie Steel
Columbia M. W. & M. I. Co.
Duff Mfg. Co.
Eureka Co.
Midvale Steel & Ord. Co.
Standard Steel Works Co.
Williams & Co., J. H.

Friction Tape
Western Elec. Co.

Frogs, Track (See Track Work)

Funnel Castings
Wharton, Jr., & Co., Wm.

Fuses and Fuse Boxes
Columbia M. W. & M. I. Co.
General Electric Co.
Johns-Manville, Inc.
Nelson Co., I. R.
Western Electric Co.
Westinghouse E. & M. Co.
Williams & Co., J. H.

Fuse Mounts
National Elec. Specialty Co.

Fuses, Refillable
Columbia M. W. & M. I. Co.
General Electric Co.
Nelson Co., I. R.

Gauges, Oil and Water
Ohio Brass Co.

Gaskets
Johns-Manville, Inc.
Power Specialty Co
Westinghouse Tr. Br. Co.

Gas-Electric Cars
General Electric Co.

Gas Compressors
Ingersoll-Rand Co.

Gas Producers
Westinghouse E. & M. Co.

Gasolene Torches
Economy Electric Devices Co

Gates, Car
Brill Co., The J. G.

Gear Blanks
Carnegie Steel Co.
Cambria Steel Co.
Midvale Steel & Ord. Co.
Standard Steel Works Co.

Gear Cases (Used)
Transit Equipment Co.

Gear Cases
Chillingworth Mfg. Co.
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.
Westinghouse E. & M. Co.

Gears and Pinions
Ackley Brake & Supply Corp
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.
General Electric Co.
National Ry. Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.
Transit Equipment Co.

General Printing
Shanklin Equipment Co.

Generating Sets, Gas-Electric
General Electric Co.

Generating Sets
Foster, H. M.

Generators
Allis-Chalmers Mfg. Co.
General Electric Co.
Western Elec. Co.
Westinghouse E. & M. Co.

Generators (Used)
Foster, H. M.
Brearley, H. P.

Goggles, Eye
Indianapolis Switch & Frog Co.

Gongs (See Bells and Gongs)

Graphite
Morganite Brush Co., Inc.

Greases (See Lubricants)

Grinders and Grinding Supplies
Indianapolis Switch & Frog Co.
Metal & Thermit Corp.
Railway Track-work Co.
Western Elec. Co.

Grinding Blocks and Wheels
Railway Track-work Co.

Grinders, Portable
Ingersoll-Rand Co.

Grinders, Portable Electric
Seymour Portable Rail Grinder Co.

Guards, Rail Clamp
Ramapo Iron Works

Guards, Rails and Fixtures
Ramapo Iron Works

Guards, Trolley
Electric Service Sup. Co.
Ohio Brass Co.

Hacksaws
Gladium Co., Inc.

Harps, Trolley
Anderson Mfg. Co., A. & J. M.
Bayonet Trolley Harp Co.
Electric Service Sup. Co.
More-Jones Br. & Metal Co.
Nuttall Co., R. D.
Star Brass Works
Western Elec. Co.

Headlights
Electric Service Sup. Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

Headlining
Haskelite Mfg. Co.
Pantasote Co.

Heaters, Car (Electric)
Con. Car Heating Co.
Economy Elec. Devices Co.
Gold Car Heating & Lighting Co.
National Ry. Appliance Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Cooper Heater Co.
Smith Heater Co., Peter

Heaters, Car (Stove)
Electric Service Sup. Co.
Smith Heater Co., Peter

Helmets Welding
Ideal Face Shield Co.
Indianapolis Switch & Frog Co.

Hoists and Lifts
Columbia M. W. & M. I. Co.
Ford-Chain Block Co.
Ingersoll-Rand Co.
Niles-Bement-Pond Co.

Hose
Ingersoll-Rand Co.

Hose, Bridges
Ohio Brass Co.

Hose Couplings
Ingersoll-Rand Co.

Hose, Pneumatic
Westinghouse Trac. B. Co.

Houses, Station & Watchmen's, Concrete
Massey Concrete Prods. Corp.

Hydraulic Machinery
Allis-Chalmers Mfg. Co.
Niles-Bement-Pond Co.

Injectors
Schutte & Koerting Co.

Inspection
Electrical Testing Lab's

Instruments, Measuring, Testing and Recording
Economy Elec. Devices Co.
Electric Service Sup. Co.
General Elec. Co.
Roller-Smith Co.
Thompson Levering Co.
Westinghouse E. & M. Co.

Insulating Cloth, Paper and Tape
Anchor Webbing Co.
General Elec. Co.
Hope Webbing Co.
Irvington Varn. & Ins. Co.
Mica Insulator Co.
Std. Underground Cable Co
Western Elec. Co.
Westinghouse E. & M. Co.

Insulating, Silk
Irvington Varnish & Ins. Co.

Insulating Varnishes
Irvington Varnish & Ins. Co.

Insulation (See also Paints)
Anderson Mfg. Co., A. & J. M.
Electric Ry. Equip. Co.
Electric Service Sup. Co.
Dolph, John C., Co.
General Elec. Co.
Irvington Varnish & Ins. Co.
Johns-Manville, Inc.
Westinghouse E. & M. Co.
Western Elec. Co.

Insulation Slot
Irvington Varn. & Ins. Co.

VAN DORN COUPLER COMPANY

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Brake Regulator

—more than a slack adjuster

An apparatus for the automatic, positive and accurate adjustment of brake rigging and the limitation of piston travel. The only slack adjuster on the market which functions during the application of the brake. Controls the length of piston travel, instead of being controlled by it.

Provides for a fixed brake shoe clearance.
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Drew Elec. & Mfg. Co.
Irvington Varnish & Ins. Co.
Electric Ry. Equip. Co.
Electric Service Supplies
Flood City Mfg. Co.
General Electric Co.
Ohio Brass Co.
Western Elec. Co.
Westinghouse E. & M. Co.

Insulator Pins
Drew Elec. & Mfg. Co.
Electric Service Sup. Co.
Hubbard & Co.

Intercommunicating Telephone
Western Elec. Co.

Insurance, Fire
Marsh & McLennan

Jacks (See also Cranes, Hoists and Lifts)
Buda Co.
Buckeye Jack Mfg. Co.
Columbia M. W. & M. I. Co.
Duff Mfg. Co.
Electric Service Sup. Co.

Joints, Rail
Carnegie Steel Co.
Rail Joint Co.
Track Specialties Co.

Journal Boxes
Bemis Car Truck Co.
Brill Co., The J. G.

Junction Boxes
Std. Underground Cable Co.

Lamp Guards and Fixtures
Anderson Mfg. Co., A. & J. M.
Electric Service Sup. Co.
General Electric Co.
Westinghouse E. & M. Co.

Lamps (Arc and Incandescent (See also Headlights)
Anderson Mfg. Co., A. & J. M.
General Electric Co.
Western Elec. Co.
Westingouse E. & M. Co.

Lamps, Signal and Marker
Nichols-Lintern Co.
Ohio Brass Co.

Lanterns, Classification
Nichols-Lintern Co.

Lathe Attachments
Williams & Co., J. H.

Lathes, Car Wheel
Niles-Bement-Pond Co.

Lightning Arrestors
National Elec. Specialty Co.

Lightning Protection
Anderson Mfg. Co., A. & J. M.
Electric Service Sup. Co.
General Electric Co.
Ohio Brass Co.
Western Elec. Co.
Westinghouse E. & M. Co.

Lighting Units
Western Elec. Co.

Line Material (See also Brackets, Insulators, Wires, etc.)
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Dossert & Co.
Drew Elec. & Mfg. Co.
Eureka Co.
Electric Ry. Equip. Co.
Electric Service Sup. Co.
General Electric Co.
Hubbard & Co.
Johns-Manville, Inc.
More-Jones Br. & Metal Co.
Ohio Brass Co.
Western Elec. Co.
Westinghouse E. & M. Co.

Locking Spring Boxes
Wharton, Jr. & Co., Wm.

Locomotives, Electric
General Electric Co.
McGuire-Cummings Mfg. Co.
Transit Equipment Co.
Westinghouse E. & M. Co.

Locomotives (Used)
Sherwood, E. C.
Transit Equipment Co.

Lubricating Engineers
Galena-Signal Oil Co.
Texas Co.
Universal Lubricating Co.

Lubricants, Oil and Grease
Galena-Signal Oil Co.
Texas Co.
Universal Lubricating Co.

Machine Tools
Columbia M. W. & M. I. Co.
Niles-Bement-Pond Co.

Machine Work
Columbia M. W. & M. I. Co.

Magnet Wire
Belden Mfg. Co.

Meters, Car, Watt-Hour
Economy Elec. Devices Co.

Manganese Parts
Bemis Car Truck Co.

Manganese Steel Castings
Wharton, Jr., & Co., Wm.

Manganese Steel Special Track Work
Ramapo Iron Works
Wharton, Jr., & Co., Wm.

Meters, Car, Watt-hour
Economy Electric Device Co.

Mica
Mica Insulator Co.

Molded Insulation and Parts
Belden Mfg. Co.
Indianapolis Switch & Frog Co.

Molding-Metal
National Metal Molding Co.

Money Changers
Galef, J. L.

Motor Bus Bodies
Paterson Vehicle Co.

Motor Buses
Day-Elder Motors Corp.
Duplex Truck Co.
International Motor Co.
Republic Truck Sales Corp.
Trackless Trans. Co.
Vreeland Motor Co., Inc.

Motor Leads
Dossert & Co.

Motorman's Safety Mirrors
Drew Elec. & Mfg. Co.

Motormen's Seats
Brill Co., The J. G.
Electric Service Sup. Co.
Wood Co., Chas. N.

Motors, Electric
Allis-Chalmers Mfg. Co.
General Elec. Co.
Western Elec. Co.
Westinghouse E. & M. Co.

Motors, Electric (Used)
Transit Equipment Co.

Motors and Generators, Sets
General Electric Co.

Mowers, Track
Rawls Machine & Mfg. Co.

Nails
Cambria Steel Co.
Midvale Steel & Ord. Co.

Nuts and Bolts
Allis-Chalmers Mfg. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Hubbard & Co.

Oil Engines
Ingersoll-Rand Co.

Oil Burning Equipment
Schutte & Koerting Co.

Oil (See Lubricants)

Ohmmeters
Roller-Smith Co.

Omnibuses
Trackless Trans. Co.

Packing
Electric Service Sup. Co.
Johns-Manville, Inc.
Post & Co., E. L.
Power, Specialty Co.
Westinghouse Trac. B. Co.
Westinghouse E. & M. Co.

Paints & Varnishes (Preservative)
Ackley Brake & Supply Corp.

Paints & Varnishes, (Preservative)
Dolph, John C., Co.
Mica Insulator Co.

Paints and Varnishes for Woodwork
National Ry. Appliance Co.

Paving Bricks, Filler and Stretcher
Nelsonville Brick Co.

Paving Breakers
Ingersoll-Rand Co.

Paving Material
Amer. Br. Shoe & Fdry. Co.
Nelsonville Brick Co.

Pickups, Trolley Wire
Drew Elec. & Mfg. Co.
Electric Service Sup. Co.
Ohio Brass Co.

Pinion Pullers
Columbia M. W. & M. I. Co.
Drew Elec. & Mfg. Co.
Electric Service Sup. Co.
General Electric Co.
Wood Co., Chas. N.

Pinions (See Gears)

Pins, Case Hardened, Wood and Iron
Bemis Car Truck Co.
Electric Service Sup. Co.
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Pipe
National Tube Co.

Pipe Fittings
Power Specialty Co.
Standard Steel Works Co.
Westinghouse Tr. Br. Co.

Planers (See Machine Tools)

Plantation Cars
Ramapo Iron Works

Plates, Double Shoulder Solid Bottom Switch Riser
Ramapo Iron Works

Pliers, Insulated
Electrc Servce Sup. Co.
National Ry. Appliance Co.

Plugs
National Metal Molding Co.

Pneumatic Tools and Accessories
Ingersoll-Rand Co.

Poles, Posts & Piling Concrete
Massey Concrete Products Corp.

Pole Line Hardware
Drew Elec. & Mfg. Co.

Pneumatic Tools
Ingersoll-Rand Co.

Pole Reinforcing
Hubbard & Co.

Pole Sleeves
Drew Elec. & Mfg. Co.

Poles, Metal Street
Bates Exp. Steel Truss Co.
Electric Ry. Equip. Co.
Hubbard & Co.

Pole Shavers
Western Elec. Co.

Poles, Ties, Post, Piling and Lumber
Duncan Lumber Co.
Southern Cyp. Mfg. Assn.
Western Elec. Co.

Poles, Trolley
Anderson Mfg. Co., A. & J. M.
Bayonet Trolley Harp Co.
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.
National Tube Co.
Nuttall Co., R. D.

Poles, Tubular Steel
Electric Ry. Equip. Co.
Electric Service Sup. Co.
National Tube Co.

Poles and Ties Treated
Duncan Lumber Co.
Western Elec. Co.

Portable Grinders
Buda Co.

Power Saving Devices
Arthur Power Saving Recorder Co
Economy Elec. Devices Co.
National Ry. Appliance Co.

Presses, Transfer
Meisel Press Mfg. Co.

Pressure Regulators
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Westinghouse Trac. B. Co.

Protectors
National Elec. Specialty Co.

Pumps
Allis-Chalmers Mfg. Co.
Ingersoll-Rand Co.
Schutte & Koerting Co.
Western Elec. Co.

Pumps, Air Lift
Ingersoll-Rand Co.

Pumps, Centrifugal
Ingersoll-Rand Co.

Pumps, Direct-Acting
Ingersoll-Rand Co.

Pumps, Used
Brearley, H. P.
Brenholtz, Roy
Foster, H. M.

Pumps, Vacuum
Ingersoll-Rand Co.

Punches, Ticket
American Ry. Supply Co.
Bonney-Vehslage Tool Co.
Internat'l Reg. Co., The
Wood Co., Chas. N.

Purifiers, Feed Water
Scaife & Sons Co., Wm. B.

Push Cars
Ramapo Iron Works
Western Electric Co

Rail Anchors
Track Specialties Co

Rail Bender
Track Specialties Co.

Rail Braces
Ramapo Iron Works
Track Specialties Co.

Rail Grinders (See Grinders)

Rail Joints
Track Specialties Co.

Rail Joints Welded
Indianapolis Switch & Frog Co.

Rail Road Track Equipment
Ramapo Iron Works

Rails, Relaying
Sherwood, E. C.
Foster, H. M.
Karaski-Friedman Co.

Rails
Cambria Steel Co.
Midvale Steel & Ord. Co.

Rails, Steel
Carnegie Steel Co.

Railway Materials
Johns-Manville Inc.

Railway Safety Switches
Westinghouse E. & M. Co.

Railway Transfer Printing
Shanklin Equip. Co.

Rail Welding
Rail Welding & Bonding Co.

Rattan
Amer. Rat. & Reed Mfg. Co.
Brill Co., The J. G.
Electric Service Sup. Co.
Hale & Kilburn Co.
Heywood-Wakefield Co.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.
Transit Equipment Co.

Receptacles and Plugs
Horne Mfg. Co.

Recorders, Power Saving
Arthur Power aving Recorder Co.

Registers and Fittings
Brill Co., The J. G.
Electric Service Sup. Co.
Internat'l Reg. Co., The
Ohmer Fare Register Co.
Rooke Automatic Reg. Co.

Reinforcement, Concrete
American Steel & Wire Co.
Carnegie Steel Co.

Repair Shop Appliances (See also Coil Banding and Winding Machines
Columbia M. W. & M. I. Co.
Comstock Mfg. Co.
Electric Service Sup. Co.

Repair Work (See also Coils)
Columbia M. W. & M. I. Co.
General Electric Co.
Transit Equipment Co.
Westinghouse E. & M. Co.

Replacers, Car
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.
Track Specialties Co.

Resistance, Grid
Columbia M. W. & M. I. Co.

Resistance, Wire and Tube
General Electric Co.
Western Elec. Co.
Westinghouse E. & M. Co.

Retrievers, Trolley (See Catchers and Retrievers, Trolley)

Rheostats
General Electric Co.
Mica Insulator Co.
Westinghouse E. & M. Co.

Riveters
Ingersoll-Rand Co.

Rivet Sets
Ingersoll-Rand Co.

Rosettes
National Metal Molding Co

Roofing Abestos
Johns-Manville Inc.

Roofs
Haskelite Mfg. Co.

Roofing, Car
Pantasote Co.

Rolled Steel Wheels
Cambria Steel Co.
Midvale Steel & Ord. Co.

Rubber Covered Wire and Cables
Belden Mfg. Co.

Safety Automatic Switch Stands
Ramapo Iron Works

Sand Rammers
Ingersoll-Rand Co.

Sanders, Track
Brill Co., The J. G.
Cleveland Fare Box Co.
Columbia M. M. & M. I. Co.
Electric Service Sup. Co.
Nichols-Lintern Co.
Ohio Brass Co.
St. Louis Car Co.

Sash Fixtures, Car
Brill Co., The J. G.

Sash, Metal, Car Window
Hale & Kilburn Co.

Saws, Rail
Track Specialties Co.

Scrapers Track (See Cleaners and Scrapers, Track)

Seating Materials
Brill Co., The J. G.
Pantasote Co .

Seats, Car (See also Rattan)
Amer. Rattan & Reed Mfg. Co.
Brill Co., The J. G.
Heywood-Wakefield Co.
Hale & Kilburn Co.
St. Louis Car Co.

Second-Hand Equipment
Archer & Baldwin
Brearly, H. P.
Brenholtz, Roy
Electric Equipment Co.
Foster, H. M.
Karaski-Friedman Co.
Transit Equipment Co.

Shields, Face
Ideal Face Shield Co.

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SOLDERED
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Makes permanent, light, level pavement with a minimum of paving repairs.

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Among certain tribes the law reads that if a husband becomes careless in his relations with the wives of other good citizens, *and is caught,* he is strung up by his heels. Then his favorite wife is called upon to take part in the festivities. The lady in question, who, take it from those who have been witnesses, often swings a nasty mit, then proceeds to administer a beautiful spanking on his stern.

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W. R. Hendey Co., Hoge Bldg., Seattle.

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Charles Farnhem, I. W. Hellman Bldg., Los Angeles.
Railway & Power Engineering Corporation, Ltd., 181 Eastern Ave., Toronto, Ontario, Canada.

WHAT AND WHERE TO BUY

Shades, Vestibule
Brill Co., The J. G.

Shovels
Allis-Chalmers Mfg. Co.
Brill Co., The J. G.
Hubbard & Co.

Shovels, Steam
Sherwood, E. C.

Side Bearings (See Bearings, Center and Side)

Signals, Car Starting
Con. Car Heating Co.
Electric Service Sup. Co.
Nat'l Pheumatic Co., Inc.

Signals, Indicating
Nichols-Lintern Co.

Signal Systems, Block
Electric Service Sup. Co.
Nachod Signal Co., Inc.
U. S. Electric Signal Co.
Western Elec. Co.
Wood Co., Chas. N.

Signal Systems, Highway Crossing
Nachod Signal Co., Inc.
U. S. Electric Signal Co.

Slack Adjusters (See Brake Adjusters)

Slag
Carnegie Steel Co.

Sleet Wheels and Cutters
Anderson Mfg. Co., A. & J. M.
Bayonet Trolley Harp. Co.
Bonney Vehslage Tool Co.
Columbia M. W. & M. I. Co.
Electric Ry. Equip. Co.
Elec. Service Sup. Co.
Eureka Co.
More-Jones Br. & Metal Co.
Nuttall Co., R. D.

Smokestacks, Car
Nichols-Lintern Co.

Slide Plates
Track Specialties Co

Snow Broom Rattan
Heyward-Wakefield Co.

Snow-Plows, Sweepers and Brooms
Amer. Rattan & Reed Mfg. Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Con. Car Fender Co.
McGuire-Cummings Mfg. Co.
Transit Equipment Co.

Snow Plows, Sweepers and Brooms (Used)
Transit Equipment Co.

Soap Powders
India Alkali Works

Sockets & Receptacles
Johns-Manville Inc .
National Metal Molding Co.

Solderless Connectors
Frankel Connector Co.

Special Adhesive Papers
Irvington Varn. & Ins. Co.

Spray Nozzles
Drew Elec. & Mfg. Co.
Schutte & Koerting Co.

Spikes
Amer. Steel & Wire Co.

Spike Drivers
Ingersoll-Rand Co.

Splicing Compounds
Westinghouse E. & M. Co.

Splicing Sleeves (See Clamps and Connectors)

Springs, Car and Truck
Amer. Steel Foundries
Amer. Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Ft. Pitt Spring & Mfg. Co.
Standard Steel Works Co.
Taylor Elec. Truck Co.

Sprinklers, Track and Road
Brill Co., The J. G.

McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Steam Turbines (Used)
Brearley, H. P.
Foster, H. M.

Strain Insulators
Western Elec. Co.

Steel Castings
Wharton, Jr., & Co., Wm.

Steel Freight Cars
Cambria Steel Co.
Midvale Steel & Ord. Co.

Steels and Steel Products
Cambria Steel Co.
Midvale Steel & Ord. Co.

Steps, Car
Amer. Abrasive Metals Co.
Amer. Mason Saf. Tread Co.

Stone Tools
Ingersoll-Rand Co.

Strand
Amer. Copper Prods. Corp.
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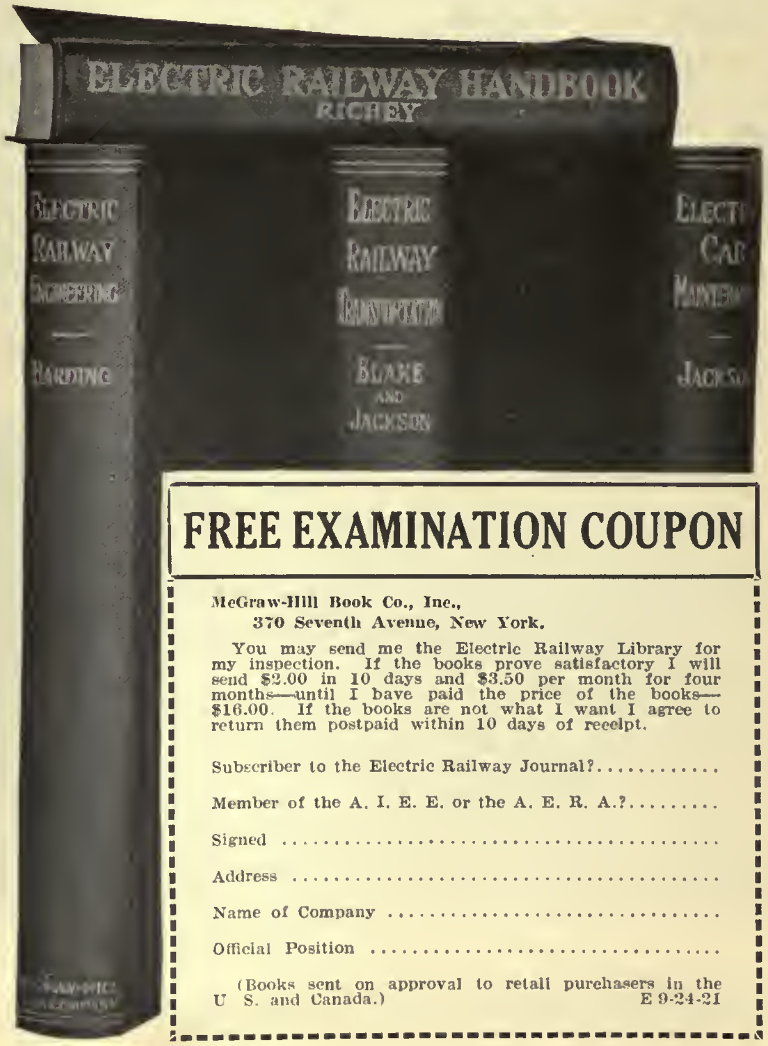

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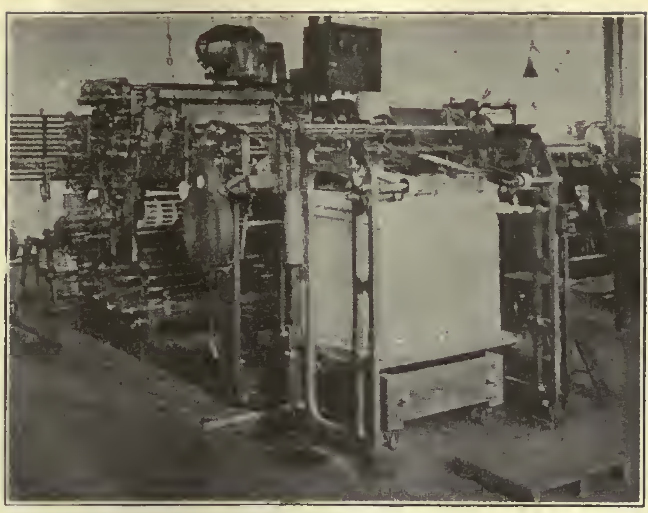

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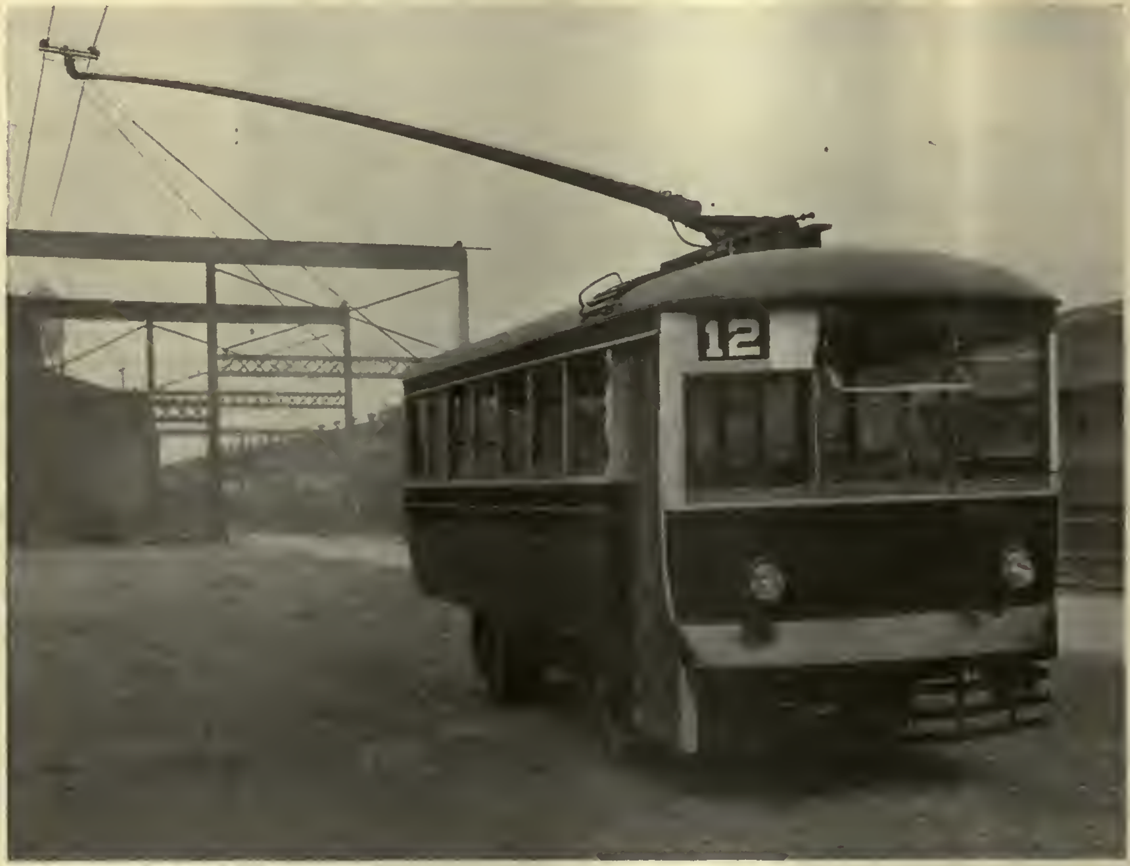

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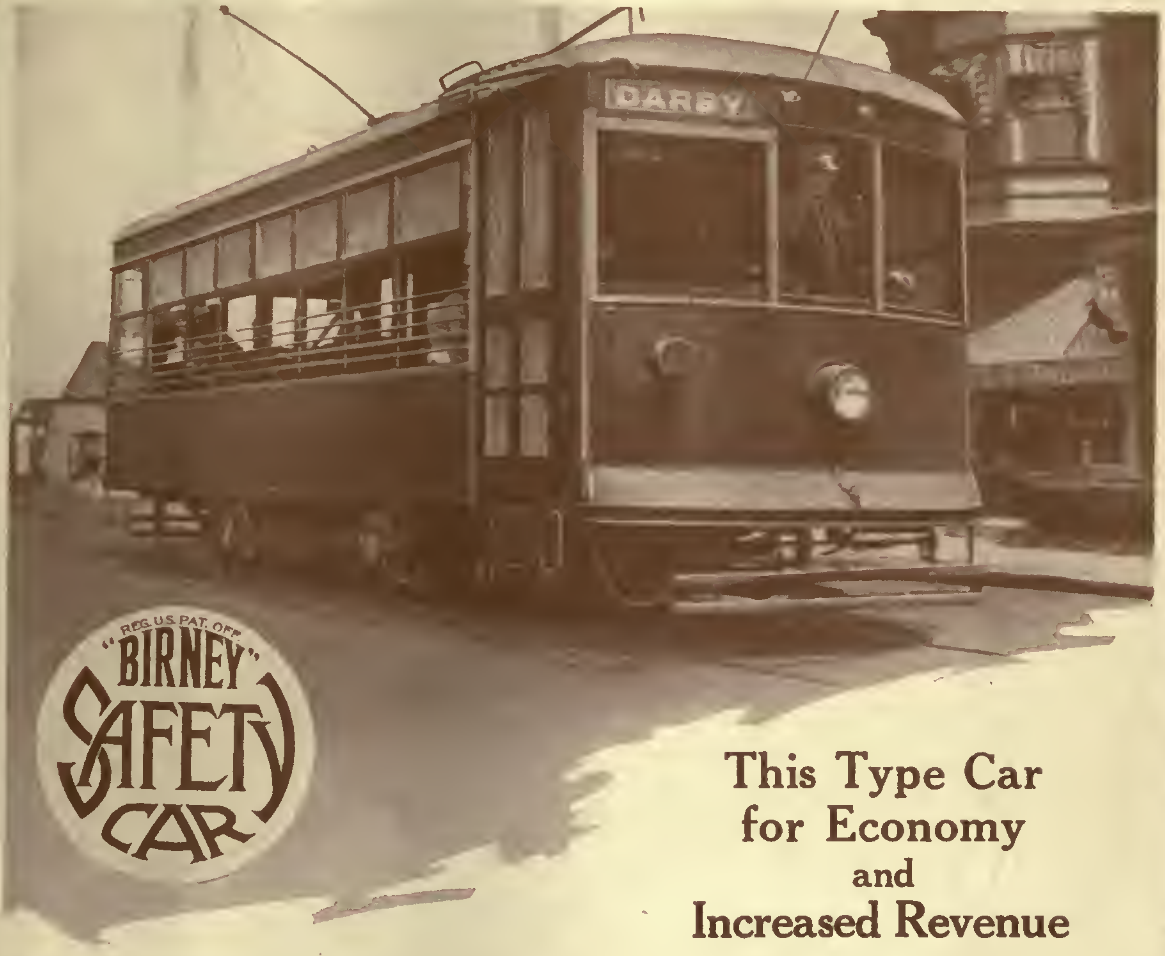

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It should also be remembered that these economical advantages are permanent, and will not be lost when the industry is returned to its former healthy financial condition.

In Service

Over 3,000 Birney Safety Cars have been built by our various plants for service in United States, Canada, Mexico, South America, New Zealand and Holland.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO. — ST. LOUIS MO.
G. C. KUHLMAN CAR CO. — CLEVELAND, OHIO.
WASON MANF'G CO. SPRINGFIELD, MASS.
Canadian Brill Company, Limited, Preston, Ont., Canada

MAINTAINING the maximum value of *car card space* to the *electric railways* means maintaining its value *to the advertisers.* Advertisers will keep buying space only so long as value measures up to definite standard.

Sounds simple—but it can't be accomplished simply by a contractor buying car card space from the railways and re-selling it to advertisers. Space must be backed by a Service that creates car cards with real sales value.

To satisfy national as well as local car advertisers it takes a *nation-wide organization.* Briefly, that is the function of the Collier Organization.

The Collier Organization permanently sustains car card space value at its highest point, hence pays the railways the highest income that can be paid continuously over a term of years.

Barron G. Collier
INCORPORATED
Candler Bldg., New York

Twenty Cents Per Copy October 1, 1921 McGraw-Hill Co., Inc.

ELECTRIC RAILWAY JOURNAL

HOUSTON, TEXAS
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CORLISS BRUSHES

Made at Bradford, Pa. In the heart of the oil country where the best raw materials come from.

"GOOD COMMUTATION THROUGH CORLISS"

CORLISS Brushes stand up under all operating conditions. Satisfactory service guaranteed. There's a Corliss Brush to meet every requirement.

CORLISS CARBON CO., BRADFORD, PA.

J. F. Kerlin, President

"Missed"

"Boss," said Joe the manager of operations, "I sure do regret that business conditions were such that the manufacturers could not afford an exhibit this year. The Westinghouse exhibit was always an inspiration to me and hundreds of other operators."

"That's true, Joe," remarked the vice-president, "I shall miss it, too, but I just received a copy of their circular for this year giving a brief review of equipment, etc., for 1921. As soon as I finish going through it I will give it to you."

"All right, Boss," said Joe, "I shall be glad to get it."

Westinghouse Electric & Manufacturing Company

Sales Offices in All Large
American Cities

East Pittsburgh
Pennsylvania

Westinghouse

Vol. 58, *No.* 14 New York, October 1, 1921 *Pages* 541-576

Electric Railway Journal

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing-Editor

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Change of Address—When change of address is ordered the new and the old address must be given. Notice must be received at least ten days before the change takes place.

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Member Audit Bureau of Circulations.
Member Associated Business Papers, Inc.

Circulation of this issue, 6,000

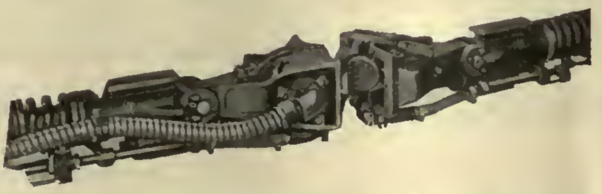
Advertising Index—Alphabetical, 44; Classified, 40, 42; Searchlight Section, 39

The "TIGHT-LOCK"

For MOTOR and TRAILER OPERATION

TIME is money during rush hour traffic. That is why the Westinghouse K-1-A Automatic Car, Air and Electric Coupler, with the distinctive "tight-lock" feature, appeals to the progressive traction operator who is watching for every opportunity to convert wasted time into revenue.

The K-1-A is particularly adapted for motor and trailer operation, or for multiple motor service. It saves time in making up trains, the impact of one car against the other being all that is necessary to establish car, air and electric connection. And with the famous "tight-lock" grip the couplings remain absolutely rigid at the joint, insuring non-leakable air line and close-fitting electric contacts.



SAFE and ECONOMICAL

ONE of the largest electric railways on the Pacific Coast reported the derailment of a train while running at a high rate of speed, and stated that loss of life undoubtedly would have resulted had it not been for a Westinghouse K-1-A Automatic Coupler which held the train together and prevented one of the cars from rolling down an embankment. The tight-lock feature is generally recognized as an important safety device.

The fact that the coupler is both safe and efficient, preventing accidents and giving long and faithful service, makes it highly desirable from the standpoint of economy. It has established a record for low maintenance.

Free Engineering Advice Furnished on Request

WESTINGHOUSE TRACTION BRAKE CO.

General Office and Works, Wilmerding, Pa.

ATLANTA
BOSTON
COLUMBUS, O
HOUSTON, TEX.

CHICAGO
DENVER, COL.
MEXICO CITY
NEW YORK

PITTSBURGH
SAN FRANCISCO
ST. LOUIS, MO.
SEATTLE, WASH.

ST. PAUL, MINN.
LOS ANGELES
SALT LAKE CITY
WASHINGTON

The SAFETY CAR

Sells Transportation—
Keeps the Public *Sold*

AMONG developments of recent years, the Safety Car stands foremost as a concrete example of successful salesmanship in transportation.

Since 1916, under the most varying conditions, in large and small communities, the Safety Car has built traffic and increased revenue by recapturing old patrons and creating new ones.

Giving better response both in acceleration and deceleration, running with greater frequency, affording maximum comfort, the great outstanding appeal to the car-riding public is *Better Service*.

This is a fact that is substantiated by the records of 340 Companies which have applied the principles of modern salesmanship to transportation by means of the Safety Car.

The increased service made possible by the Safety Car not only results in more traffic and more revenue, *but actually costs less!*

"Sell It the Safety Car Way"

SAFETY CAR DEVICES CO.
OF ST. LOUIS, MO.
Postal and Telegraphic Address:
WILMERDING, PA.
CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH

It is not a Safety Car unless equipped with our standard Air Brake and Safety Car Control Devices.

MAKE ONE-MAN CAR OPERATIONS SAFER with—

U. S. ELECTRIC SIGNALS

A single operator, responsible for the entire work on one-man cars, has a lot of things to look out for—collecting fares, punching transfers, opening and closing doors, making out reports and keeping the car on time. Add to all these the meeting of cars on turnouts, and there is a hazard which must be guarded against. The human memory sometimes fails.

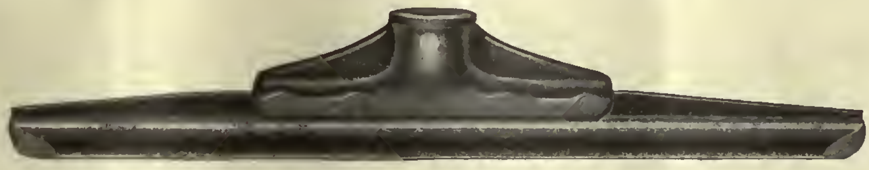
But with single-track operation safeguarded by U. S. Electric Signals, which positively indicate not only the presence of any other car in the block, but also its direction of travel, you have the human element—the chance of forgetting—eliminated.

Remove Risks with U. S. Electric Signal Equipment

A generation of success in signal specialization stands back of United States equipment.

UNITED STATES ELECTRIC SIGNAL COMPANY
West Newton, Massachusetts

Representatives:
Western: **Frank F. Bodler, Monadnock Bldg., San Francisco**
Foreign: **Forest City Electric Services Supply Co., Salford, Eng.**



O-B Extruded Ear (Patented) has an extruded brass runner piece on which is clinched and riveted a sherardized malleable iron boss. The boss is packed with grease at the factory.

On Round Wire

You'll never cut maintenance to the minimum until you use O-B Extruded Ears

Enormous pressure squeezes red hot (not molten) bronze through a die to make the extruded metal for O-B Extruded Ears.

Toughness, ductility and denseness are literally crowded, forced into the metal by the very nature of the process. The die gives, to every inch of extruded metal, uniform dimensions and a true contour.

There's a sure and easy way to find out just how much O-B Extruded Ears can save—alternate a few of them with cast ears and watch results. One railway, which did that, found the cast ears worn out in 34 months, while at the end of 70 months O-B Extruded Ears were still on duty and good for more.

On Grooved Wire

On Figure 8 Wire

The Ohio B Brass Co.
Mansfield, Ohio, U.S.A.

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION 1921

New York Philadelphia Pittsburgh Charleston, W. Va. Chicago Los Angeles San Francisco Paris, France
Products: Trolley Material, Rail Bonds, Electric Railway Car Equipment, High Tension Porcelain Insulators, Third Rail Insulators

1903 NORTHWESTERN PACIFIC 1921

EIGHTEEN YEARS OF SERVICE

prove the efficiency of *UNION* automatic block signals controlled by continuous A. C. track circuits.

In 1903 the first A. C. track circuits ever installed were put in service on the Northwestern Pacific. They are still giving entire satisfaction.

"Safety AND Economy"

Trade US Mark **Union Switch & Signal Co.** Trade US Mark

SWISSVALE, PA.

Protect the 82% By Using Steel Twin Ties

82% of the cost of a typical design of concrete track foundation is for items other than ties. Yet the success or failure of the track is largely dependent on the tie used.

Even if the tie selected increases the cost of the construction it is justified to protect the larger part of the investment.

But, with STEEL TWIN TIES, the first cost of the construction is less than with wood ties in concrete.

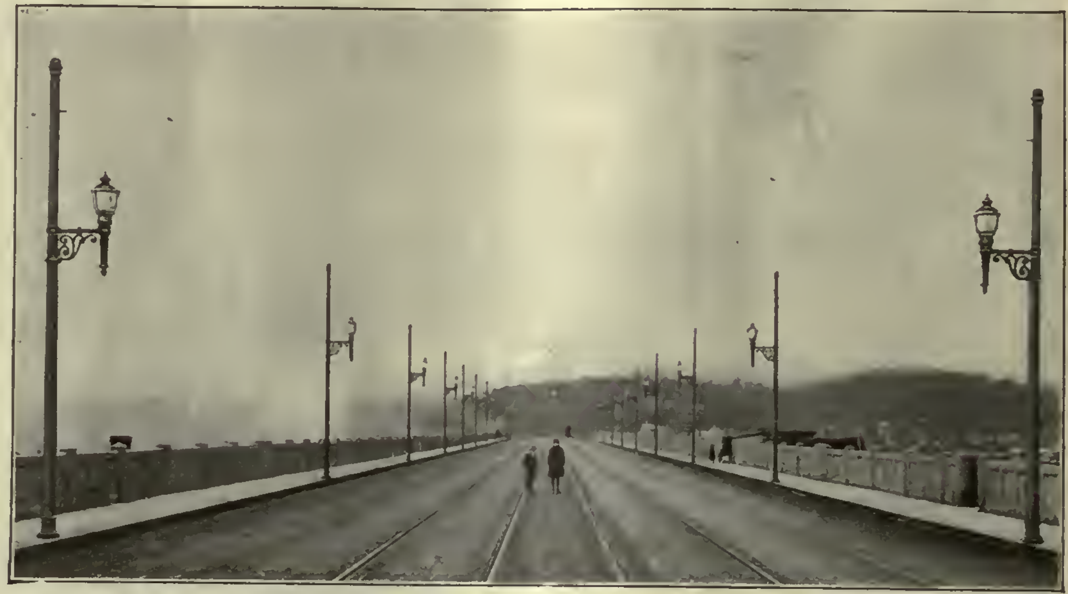
Protect the 82% and save in first cost, too.

The complete data is sent on request, in a permanent folder. Write now.

Steel Twin Tie Track

THE INTERNATIONAL STEEL TIE COMPANY, Cleveland, Ohio

International Steel Twin Ties manufactured and sold in Canada by Sarnia Bridge Co., Ltd., Sarnia, Ont.



The Best Type of Construction

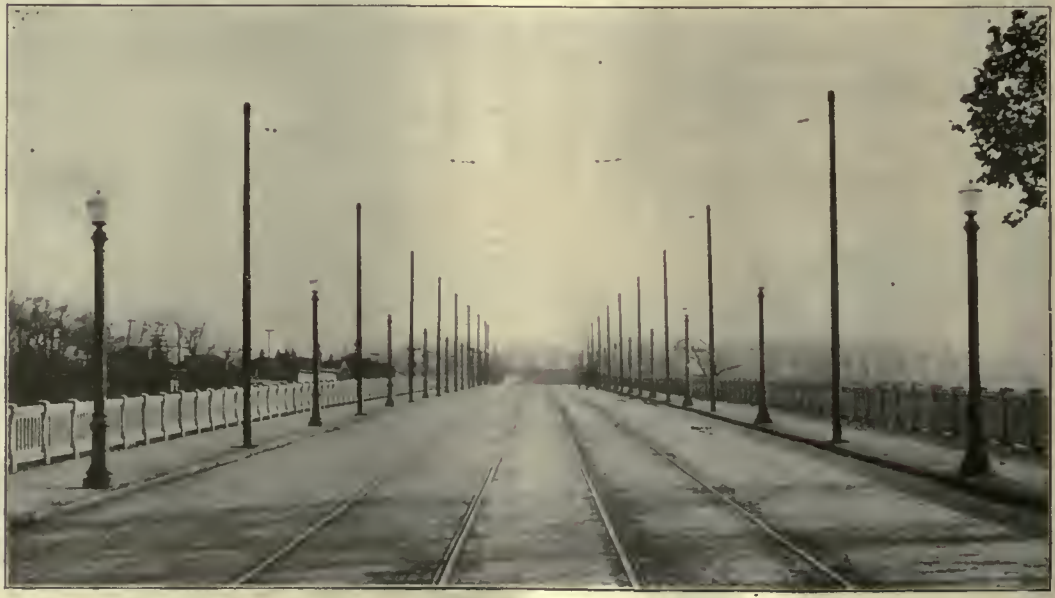
These two viaducts are both in the same city, and the railway span wires in both cases are carried on Elreco Tubular Steel Poles.

In one case, however, it was thought necessary to use separate lamp standards for supporting the lighting units as shown on lower viaduct; note the effect in useless duplication of poles, the unattractive appearance of curb line; to say nothing of double expense of installation and maintenance.

In contrast note the clear cut appearance of the upper viaduct, Elreco Combination Poles carry the span wires for the trolley support and also attractive brackets and ornamental lighting units.

If you have a similar problem, why not profit by this city's experience?

The Electric Railway Equipment Company
Cincinnati, Ohio
30 Church St, New York City
Manufacturers



There's a Golden Glow for every car and every character of service

When you buy headlights—regardless of type of car and service—buy the reflectors. For no headlight is a real headlight unless it has a real reflector.

Golden Glow Reflectors are permanent reflectors. They never rust, and they throw a more penetrating and non-blinding beam of light.

Write for data sheets

ELECTRIC SERVICE SUPPLIES CO.

Manufacturer of Railway Material and Electrical Supplies

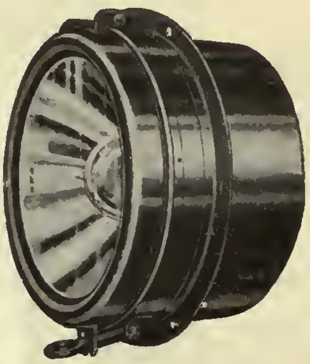
PHILADELPHIA
17th and Cambria Streets

NEW YORK
50 Church Street

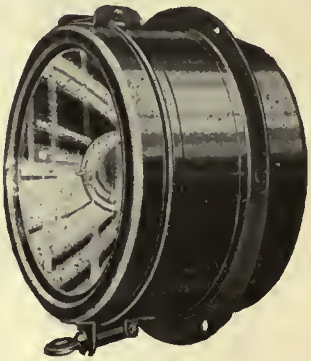
CHICAGO
Monadnock Bldg.

Branch Offices: Boston, Scranton, Pittsburgh

Canadian Distributors:
Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Winnipeg, Vancouver



Type RR-96 Golden Glow Headlight

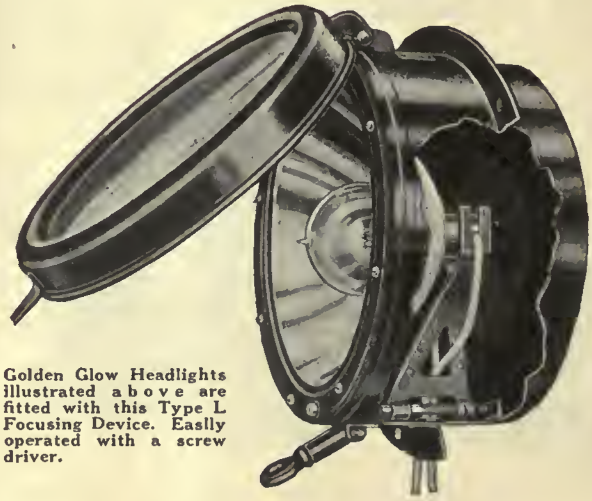


Type RM-96 Golden Glow Headlight

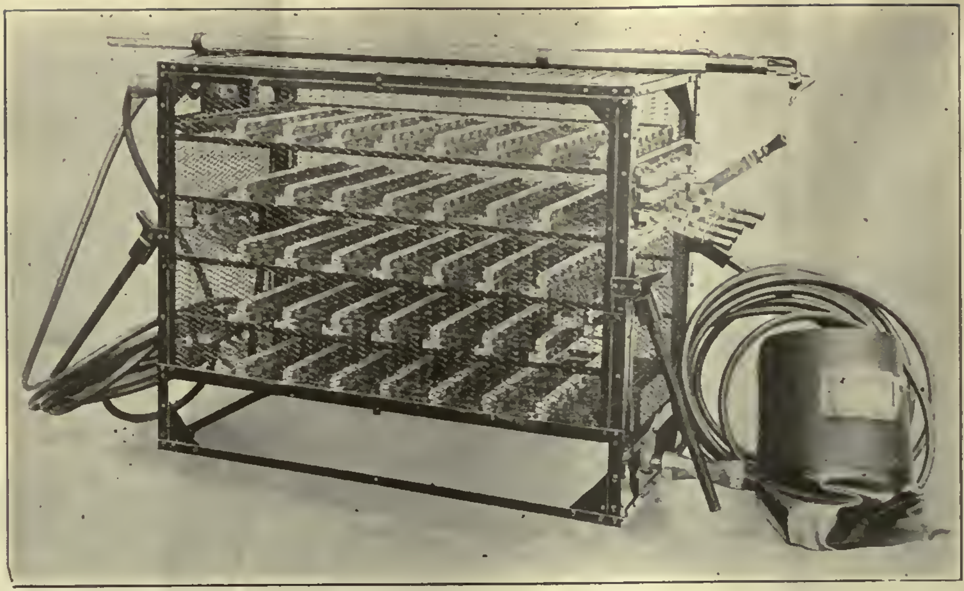
Type T Golden Glow Headlight, 9-in. Reflector for city and suburban service.

Type RE-96 Golden Glow Headlight

Type T Golden Glow Headlight, 14-in. Reflector for high speed interurban service.



Golden Glow Headlights illustrated above are fitted with this Type L Focusing Device. Easily operated with a screw driver.



"AJAX"

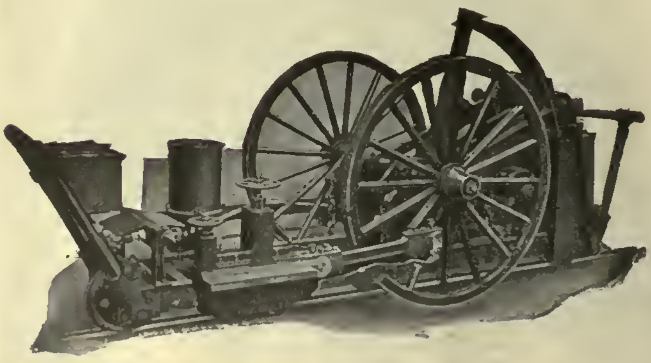
the high-capacity electric arc welder

The Ajax Electric Arc Welder offers 50% higher capacity than any other resistance machine on the market. At 600 volts it will deliver 333 amperes. Weak voltage, often met with on long electric railway lines, causes only slight decrease in capacity. Poor work in track welding has often been traced to the limited capacity of welding equipment, incapable of producing sufficient current when the trolley voltage declines.

The high capacity of the Ajax permits its use for carbon arc welding.

A switchboard with substantial knife switches is mounted on one end. By means of these switches, resistance coils may be cut in and out, and the current varied. Thirty-six different combinations may be had.

Send for full description



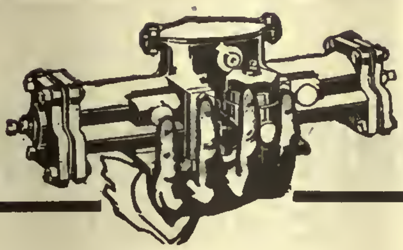
Reciprocating Track Grinder

Get Rid of Corrugations

We offer three different types of rail grinders, Atlas, Universal and Reciprocating. The Reciprocating Grinder is especially suitable for smoothing out those annoying car-rattling corrugations.

Railway Track-work Co.
3132-48 E. Thompson St., Philadelphia, Pa.

Modernize!



Pneumatize!

What Every Modern Grocer Knows

The average grocery clerk isn't paid as much for his time as your motormen and conductors, but how often do you see a clerk in a real store grinding coffee by hand?

And yet, grinding coffee by hand isn't half as strenuous or one-tenth as frequent a job as opening and closing car doors; but wise grocers don't put up with it any more since, possibly your own central station department showed them that the electric motor gives the clerks time to attend to more customers and with less distraction.

If the use of power is a good thing in a grocery, it is a better thing on a car where *time* is a far more essential element. The relief from avoidable drudgery will not only raise the morale of your men, but will also enable them to

Concentrate on the care and fare of the patron

National Pneumatic

Door and Step Control
Door and Step Operating Mechanisms
Motorman's Signal Lights
Safety Interlocking Door Control
Multiple Unit Door Control

Manufactured in Canada by
Dominion Wheel & Foundries, Ltd.
Toronto, Ont.

National Pneumatic Company, Inc.
Originator and Manufacturer
50 Church St., New York
Edison Bldg., Chicago
Works: Rahway, N. J.

McGUIRE-CUMMINGS MANUFACTURING CO.

CHICAGO

SNOW SWEEPERS

Now is the time to check up on your snow fighting equipment for the coming winter.

McGuire-Cummings Single and Double Truck Snow Sweepers and Plows are "Standard Equipment" on practically every Electric Street Railway Line in the United States and Canada that has snow to contend with.

Specifications and drawings upon request.

McGUIRE-CUMMINGS MANUFACTURING CO.

City and Interurban Cars and Trucks,
Combination and Work Cars,
Electric Locomotives

GENERAL OFFICES
111 WEST MONROE STREET
CHICAGO, ILL.

Specially prepared for lubricating trolley wheels, switch groups, controllers, engineers' valves, etc.

TULC 2VH

Tulc is unequalled for lubricating trolley wheels, switch groups, controllers, engineers' valves, etc.

In addition to insuring a marked decrease in lubricating costs, its physical characteristics make it the ideal lubricant for this particular service.

For TULC 2VH contains neither acid nor filler—it will not harden nor gum—it keeps indefinitely in any climate—it will not freeze in winter—it prevents rust and corrosion.

TULC 2VH put up in sizes to fit the need of small and large users. It can be purchased in 5, 10, 25 and 50-lb. cans, half-barrels or barrels.

Order a trial can today or write for further particulars.

"Overall Specialists"

The service men who work with you on your lubricating problems are not "experts on theories." They put on overalls and get right down to brass tacks—pack your cars—*show* you how and why Tulc should be used. They get results — real money-saving results—99 times out of a hundred. The hundredth time there is no charge for the service.

TULC A LUBRICANT

***The* Universal Lubricating Co.**

Offices: Schofield Bldg. Works: Sweeney Ave.

Cleveland, Ohio

—scientifically and accurately compounded to reduce lubricating costs

"Constructing the Overhead in Detroit"

Extracts reprinted from July 30, 1921, issue of Electric Railway Journal.

"ADHERENCE to the use of standard fittings and materials, substantial and permanent nature of the construction and the use of labor-saving devices and methods characterize the overhead work of the Detroit Municipal Railway.... Following the requirements of a city ordinance, tubular steel poles are used within a circle approximately 2 miles in radius, with the center at the City Hall.... The steel poles are 30 ft. high and made up in three sections, 7 in., 6 in. and 5 in. in diameter, for tangent track and fitted with a plain cast-iron cap and a 2-ft. dog guard placed to extend 1 ft. above and 1 ft. below the ground line. The bottom section of these poles is extra heavy, the other sections being of standard thickness. For use at strain points the steel poles are made up of 8-in., 7-in. and 6-in. diameter sections. The poles are set in concrete 6 ft. in the ground."

"NATIONAL"

TUBULAR STEEL POLES

for

Span Wire, Electric and Gas Light, Telephone, Telegraph, Tickler and Transmission Poles

are

The Recognized Standard where DURABILITY, APPEARANCE and SAFETY are the important considerations.

Ask for Bulletin No. 14—
"NATIONAL" TUBULAR STEEL POLES

NATIONAL TUBE COMPANY, PITTSBURGH, PA.
General Sales Offices: Frick Building
DISTRICT SALES OFFICES
Atlanta Boston Chicago Denver Detroit New Orleans New York Salt Lake City Philadelphia Pittsburgh St. Louis St. Paul
PACIFIC COAST REPRESENTATIVES: U. S. Steel Products Co. San Francisco Los Angeles Portland Seattle
EXPORT REPRESENTATIVES: U. S. Steel Products Co. New York City

QUALITY-SERVICE-ECONOMY
GSO
GALENA-SIGNAL OIL CO.

The Guarantee Contract

When a street railway company signs a contract for Galena Oils it is not simply a question of buying oils, but *lubrication* and *service*. Oils of themselves are valueless—it is their ability to eliminate friction and protect and preserve the bearing parts of expensive equipment that gives them value to the purchaser. This value cannot be gauged by oil bulk, but by lubricating service.

Galena Oils may be purchased on either the gallonage, or the mileage and kilowatt hour basis. The contract is merely a guarantee of the ability of the gallons involved to perform collectively the same degree of service as they are capable of giving individually.

It is our implicit confidence in the ability of Galena Oils to render maximum service that makes the guarantee contract possible. This confidence is begotten of the knowledge of experience, and the absolute certainty that the uniform high quality of our products are carried in every gallon.

The guarantee absolutely demands so many lubricating service units from each gallon of oil. It offers complete protection to the consumer. It is proof positive of *Galena Quality*, as no other oils have been successful in meeting its requirements.

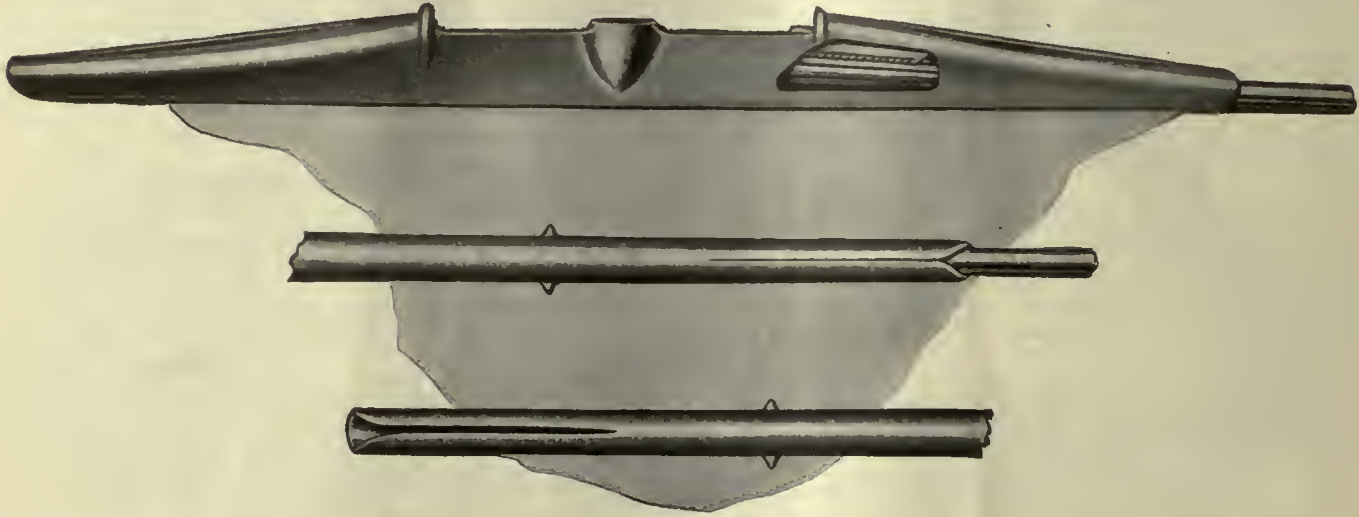
The guarantee contract is a challenge to quality;
it determines the difference between
"con" and confidence.

QUALITY-SERVICE-ECONOMY GSO GALENA OILS

Galena-Signal Oil Company
New York - Franklin, Pa. - Chicago
- and offices in principal cities -

QUALITY-SERVICE-ECONOMY GSO GALENA OILS

One sure way to reduce the trouble and expense of line-down tie-ups is to use sleeves that can be relied on for great strength



They Stick To Their Job

Imagine a joint or a suspension point in a trolley wire being stronger than the wire itself! Improbable? Not at all. That's exactly the sort of strength G-E R-3 Splicing Sleeves bring to a line. With standard wedges they will solidly hold a wire worn to half size.

Heavy strain tests on the R-3 show that wire invariably breaks outside the sleeve. The device itself does not weaken. The ends of the R-3 are tapered to dampen out vibration, thus reducing the chance of wire snapping at the sleeve tips. The long, V-shaped slot in the bottom permits the tips to be peened neatly around the wire forming a smooth path for trolley wheels.

The R-3 does double duty. By the addition of an adapter it becomes an ear. Its users, therefore, need not carry a stock of both ears and sleeves.

General Electric Company

General Office
Schenectady, N.Y.

Sales Offices in
all large cities

40-134

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing Editor
HARRY L. BROWN, Western Editor N. A. BOWERS, Pacific Coast Editor H. S. KNOWLTON, New England Editor C. W. SQUIER, Associate Editor C. W. STOCKS, Associate Editor
O. J. MACMURRAY, News Editor DONALD F. HINE, Editorial Representative

Volume 58 New York, Saturday, October 1, 1921 *Number* 14

There Is a Good Program for Atlantic City Next Week

ALTHOUGH there will be no exhibits at the convention this year, the program of papers and reports to be presented is so attractive that a good attendance should be assured. A perusal of the reports and papers already issued in advance shows them to be of unusually high character and on subjects which are of the livest interest now in electric railway circles. While annual conventions in the past have always been accompanied by exhibits, the association has precedents for gatherings without that accompaniment in the midyear conferences and in the one-day annual meetings which were held during the war. That these meetings have been considered worth while by the membership at large has been attested by the good sized attendance. By so much more should electric railway men consider as worthy of their presence a four-day simultaneous meeting by five electric railway associations. All who can should be at Atlantic City next week.

Electric Railways' Interests in Reducing Unemployment

THE unemployment conference now being held in Washington is of interest to the electric railways in two ways. One is through their gross receipts. The man who is working has to travel to and from his place of occupation and usually uses the street car twice a day to do so. Moreover, he is earning money, and both he and his family are bound to spend some of it each day in electric railway travel. The second interest which the electric railway companies have in the unemployment conference is that they are large employers of labor. Even in present conditions they have many men on their payroll, but in more favorable circumstances—that is to say, if the electric railway industry had returned to normal—they would be the direct employers of many more, not only in transportation on additional cars but in track and car maintenance and to some extent, probably, in new construction. Moreover, they would be large purchasers of equipment and thus indirectly provide work for many more.

Undoubtedly there is much work in this country which was postponed during the war and is needed now to overcome the uncared for depreciation of the past five years and to make up for the work which was suspended while the energies of the nation were devoted to the manufacture of war material. The electric railway industry presents one example only. There are others, as in the steam railroad industry and housing. The problem is how to make this work available to the vast army of unemployed—estimated to number from three to five and one-half millions—and provide the money to remunerate them.

Obviously in commercial industries this work can be begun only if the whole enterprise will show a profit, and this after all will undoubtedly be found to be the reason for the delay in most of the instances cited. The high prices which are still charged for many materials and for labor have been a stumbling block. General Atterbury's statement which appeared in the daily press on Sept. 27 describes the situation succinctly so far as it concerns the railroads. How far the present unemployment situation will change this condition remains to be determined. The conference begins its work under good auspices, and it is to be hoped that a remedy will be found.

Association Standards and Standardization in General

THE complaint is often heard that association standards are not used as they should be. There is undoubtedly some basis for such a complaint, but it gives no reason for discouragement or reduction in the expenditure of time and effort in this work. The fact is that honest, earnest and intelligent effort directed toward standardization is never lost. It always produces some effect in raising practice to higher and higher levels.

That standardization effort is not lost can be seen from a definition of the term. No matter how the idea is stated the fundamental principle is substantially this: Standardization is the codifying of existing knowledge in such a way as to place within the reach of everybody the results of the best experience and thought of the leaders in practice and analysis. Obviously such work cannot be without result. Isn't this what every association committee is trying to do in its particular field? Isn't this what is needed to improve construction and operation on every electric railway property? Isn't this the principal reason for the existence of the association anyway? Certainly, yes. And even if every railway does not use the association standard rail or standard wheel, it does benefit from the codifying of information gathered and analyzed patiently year after year.

The purpose of standardization in all lines is to reduce effort and cost. Whenever a new installation is to be made or a new procedure inaugurated, the first step is to ascertain the best present practice in connection therewith. If any appropriate standards have been adopted by authoritative bodies, so much the better. The principle applies to even so simple a matter as the layout of a desk. Some desks would stand quite a little standardization. This, however, is a "touchy" matter and the illustration will be pushed no further. In the case of such important matters, however, as electric railway supplies, the advantages to be gained by the use of standards are so great that the latter should be used unless there is overwhelming reason to the contrary. The first advantage is in the assurance that the best known practice is being followed. Another is that the railway will ultimately reap the benefit of lower manufacturing costs. Still another is in securing the interchangeability of parts, and a fourth is that repair parts can be had more promptly than otherwise.

It is quite a job to utilize fully the standardization work of the association committees as it develops, but the job is worth while. Lack of familiarity with this work is one cause of failure to use it. A pressing problem before the association is to "sell" the standards to the membership. This ought not to be necessary, but unfortunately it is so. After the association has done its duty, it is up to every railway manager, in co-operation with his department heads, to see that the property is benefited to the utmost from the association work.

But even if the greatest possible use is not being made of association standards, great use is being made of them. The committees are building a valuable literature around electric railway practice. And the spirit with which the committees function every year, and in particular have functioned during the past year, shows that their members realize that they are making a real contribution to the good of the industry.

Why Railways Fail— Ordinary Selling Publicity Needed

ALTHOUGH, as a class, electric railways are giving more thought to publicity of their service than in past years, some still fail to realize how imperative such publicity has become since the advent of the jitney or the motor bus. It is in the transportation business now as it is in any other industry where there is competition—the least remissness or dozing is seized upon by the rival claimant to patronage. An account of an actual case will make the point clear.

For possibly fifteen years past it has been customary for the interurban cars of a certain route to run to a loop within a few hundred feet of an important steam railroad station in an Eastern city. Because of the greater frequency of the electric service between this city and the other terminus of the interurban, most strangers have favored the electric railway. These outsiders have always formed a respectable fraction of the total riding, so that one would expect that any radical change in routing would be brought to their attention. This has not been the case. In our innocence, one morning, we went to the loop from which we had taken this car dozens of times in past years and waited, and waited and waited. Every variety of interurban but the one that we wanted came by. Finally, one of a group of nearby jitney drivers asked where did we want to go? On our naming the town, he hee-hawed and said, "Them intaoibans only goes to the city line now. You'll nevuh git the nine-fifteen if yuh waits f'r a car, but my bus 'll git the connection O.K." So we foreswore our good resolutions and made the connection.

When one considers that a simple sidewalk sign or a piece of enameled tin suspended from a span wire would have apprised the prospective passenger of this change, it is inexplicable why nothing of the kind was done except to assume that the management expected the stranger to know, by intuition, the changes in service as minutely as itself. We know of one merchant who merely moved three or four numbers up the main street, but nevertheless kept advertising his removal for a year thereafter. Here was a man who knew better than to take chances with his clientele, and he was telling about it in paid newspaper space, too—not in cost-free signs. Better too much than too little publicity is a safe rule for the electric railway in these days when no one can stand at a corner very long without being solicited by taxi or jitney driver.

Beautifying Waste Ground Is a Paying Proposition

HAVE you any possibilities in the way of garden spots around your shops, carhouses, power houses, substations and miscellaneous buildings? If you have, now is a good time to plan and plant for next spring. There is an increasing appreciation of the practical benefits of simple but tasteful planting around electric railway buildings. Visitors to such properties as those in Portland, Ore.; Harrisburg, Pa.; Schenectady, N. Y., and many other cities carry away a pleasant impression of what they have seen, which is greatly enhanced by the surroundings of necessarily prosaic buildings. There are several reasons why these pay in dollars as well as esthetic satisfaction. Here are three of them.

In the first place men work with most satisfaction, and therefore best, in attractive surroundings. There are few who do not enjoy green foliage and bright blossoms, especially those engaged in manual work. Again, vines, shrubbery and flower beds around utilitarian buildings, such as shops and the like, will produce a general effect which could be had only at much greater cost by architectural embellishment. In addition to these considerations, if a shop or substation, for example, is located where it is seen by many patrons, its grounds, however small, offer a wonderful opportunity for some good publicity work. Attractiveness at this point is one of those superficial but important suggestions of good management.

Here, fortunately, is one place on an electric railway where big results can be secured at practically no cost. Plants can be had for little or nothing, and in many cases the men who are employed about the plant will gladly undertake to prepare the soil and tend the garden. All that is needed is some one imbued with the right idea and capable of exerting a little "punch" to put the thing over.

What Is the Answer?

STATISTICS have the reputation of being dry, but the following indicate a problem in concrete form. In 1912 the steam railroads earned a return of about 5 per cent on their property investment; in 1920 they earned less than one-third of 1 per cent. In 1912 operating expenses took 70 cents out of every dollar of operating revenue; in 1920 they took 94 cents. In 1912 labor took 43 cents out of every dollar of operating revenue; in 1920 labor took 60 cents. Yet in 1920 with only 8 per cent more mileage and 30 per cent more investment the railroads were able to produce 58 per cent more ton-miles and 45 per cent more passenger-miles than in 1912. Operating revenue also increased 120 per cent in the same period, yet there was a decrease of 90 per cent in net operating income.

It is said that freight and passenger rates are at the economic peak, that wages must be maintained and that transportation is a necessity, yet these figures show that with splendid operating efficiency the railroads earn no return. Who takes the loss? Thousands of workers, banks and insurance companies who have invested their capital in railroads and who now say "no" to every request for more capital.

The same conditions prevail in general in the electric railway industry, and there are only two things to do to relieve the situation: cut down expenses and sell more transportation.

Single Phase Gives Way to the Automatic Substation

York Railways Discards 6,600-Volt Single Phase on the 18-Mile Hanover Interurban Line for Direct Current from Two 500-Kw. Automatic Substations—New Cars of Same Capacity Are Nearly 16 Tons Lighter than Those Replaced

A TRAIN OF THE OLD INTERURBAN CARS WHICH USED EITHER DIRECT OR ALTERNATING CURRENT

THAT portion of the York Railways high-speed interurban line between the York city limits and Hanover, Pa., after thirteen years operation at 6,600 volts single phase, has been converted to a direct-current system. The total length of the line from the center of York to its terminus in Hanover is 18.58 miles, 3 miles of which is within the city limits of York and Hanover, and, of course, was operated at 600 volts direct current. Two 500-kw. automatic substations now furnish the power to this newly changed-over section of the line which has been left insulated for the high potential. A much more satisfactory service is now being furnished with a type of car of the same seating capacity as the former car but weighing almost 16 tons less and having a total motor rating smaller by 40 hp.

There were many considerations which influenced the redesign of the line for entire direct-current operation. Needless to say, when direct current can be fed into the trolley with all the advantages of alternating-current transmission through the medium of the automatic substation, and when such a system allows an added flexibility in operating methods and a decreased complexity of equipment, high voltage single phase is placed at a distinct disadvantage. Particularly is this condition true when with a.c. operation the rolling stock must also be equipped to use current in either form.

All five of the original cars were each equipped with four Westinghouse 75-hp. 135-A motors, connected for multiple operation with the unit-switch pole system. The passenger cars, capable of seating fifty-two people, weighed 86,600 lb. They had a free running speed of about 45 m.p.h. As one of the illustration shows, the cars were equipped both with two trolleys and with a pantograph.

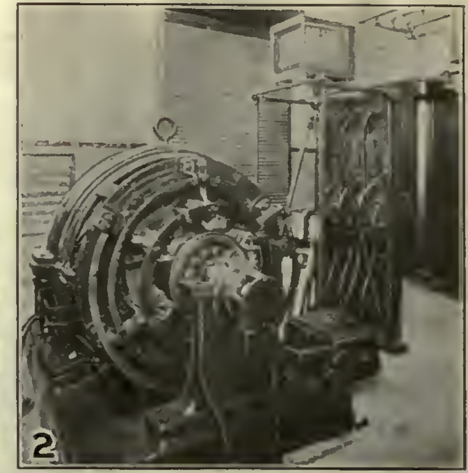
A weighty factor influencing the change was the high maintenance cost of these cars.

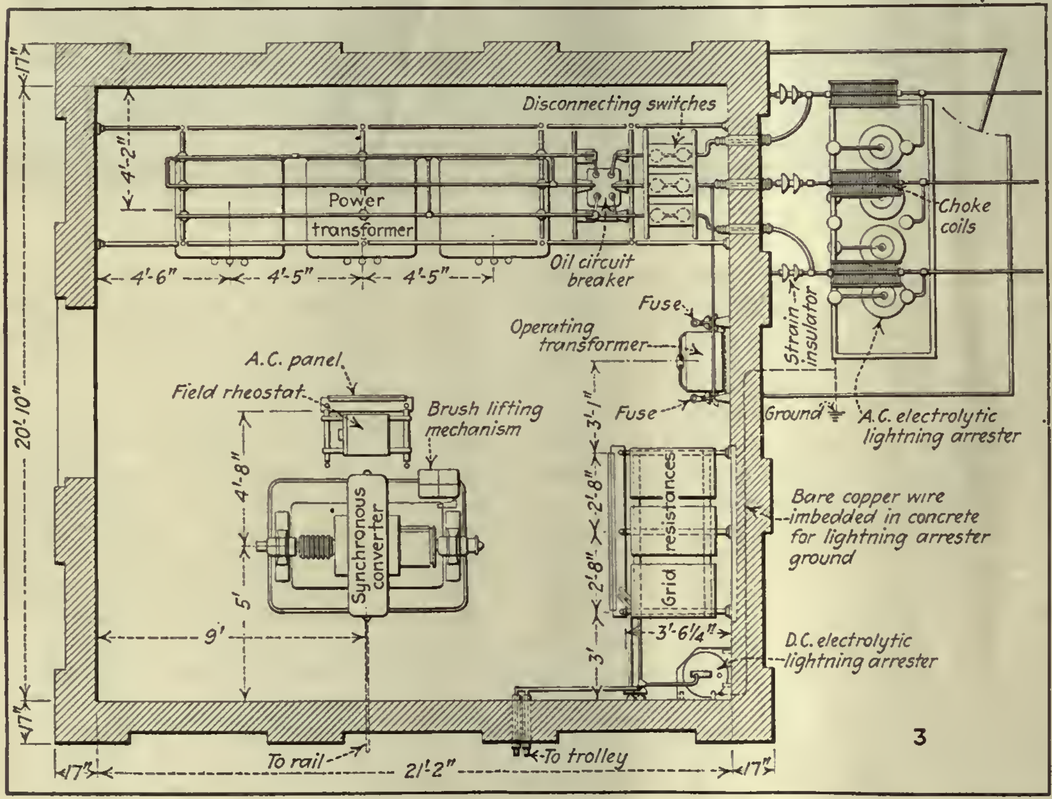
An added disadvantage that prompted the change was that the direct-current equipment on several other of the shorter interurban lines could not be used on this line. This meant a very severe handicap in the way of flexibility with the result that a larger number of cars must be kept available in operating condition for a given amount of service. The quality of service under these conditions was not up to the standard that the company wished to furnish.

Six steel fifty-two passenger Brill cars now furnish transportation between York and Hanover. The two extra cars are available for service not only on this line, but on the other interurban lines. These cars weigh 55,200 lb. each. They are equipped with Brill MCB trucks and four Westinghouse 65-hp. CV-4 field-control motors using Westinghouse HL control. The brake equipments, together with the CP27-B air compressors, were furnished by the General Electric Company. These cars have a maximum speed of 45 m.p.h. and are run in two- or three-car trains, according to the volume of traffic. Hourly service is furnished in both directions, while there are two trips of the freight car per day. The actual running time is but fifty minutes.

Two 500-kw. substations were installed to furnish direct current to the old alternating-current section. One of these is 8 miles from York at Martin's Siding, and the other is 15.7 miles from York at Gitt's Run near the end of the line. Both of these stations, together with the automatic control equipment, were installed by the Westinghouse Electric & Manufacturing Company. How compact and attractive they are can be observed from the photographs reproduced. Operating results from these stations have been entirely satisfactory. Experiment has shown that the Martin's station is out twenty-eight minutes of every hour with normal service. Both stations have low direct-current output relays with a time setting of ten minutes, which is used because this is the interval of layover at the end of the line, thus eliminating an unnecessary shut down, followed immediately by a demand for power. Power is furnished to these stations through a new three-phase, 60-cycle, 11,000-volt line.

The question as to what to do with the overhead line was another problem. The overhead, as used for 6,600-volt operation, consisted of the Westinghouse





Views of the Revamped Hanover Line Installation of the York (Pa.) Railway

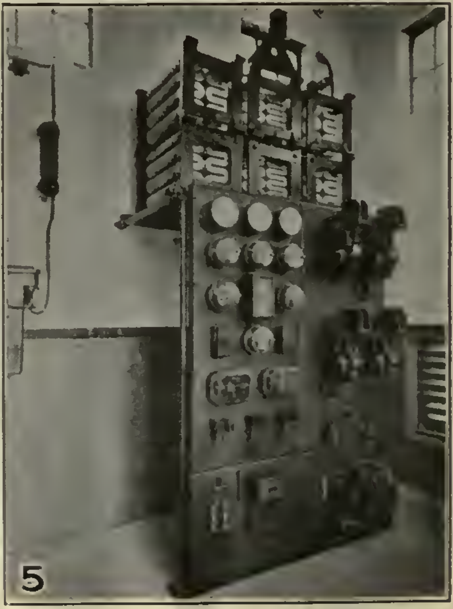
No. 1—Neat and compact 500-kw. substation at Martin's Siding.

No. 2—500-kw. rotary, also showing brush lifting mechanism, alternating-current panel and one transformer.

No. 3—Plan of the latest thing in the design of small automatic inclosed substations for railway use.

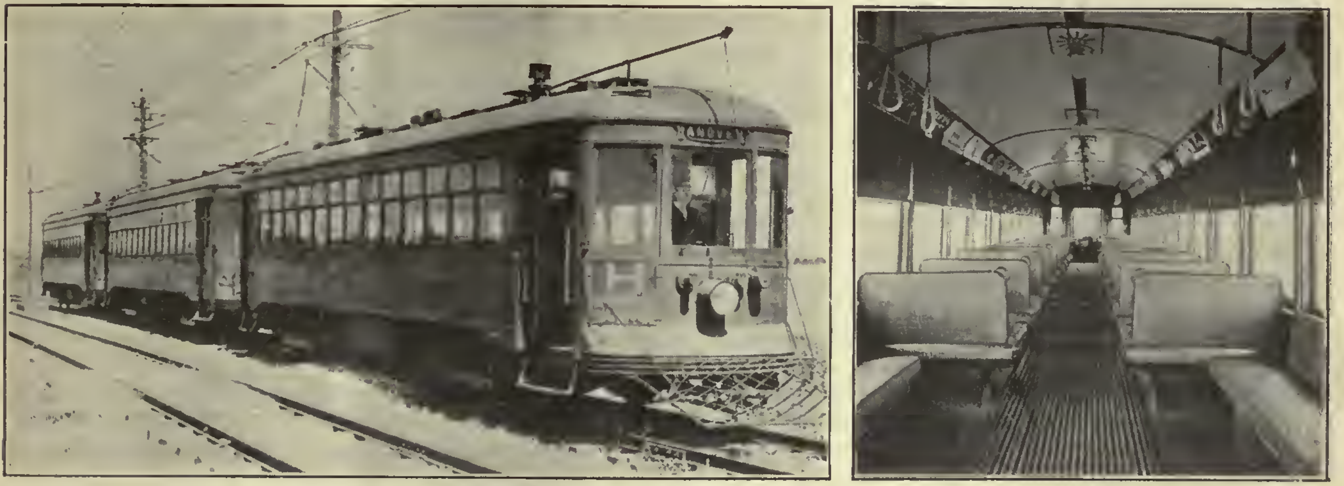
No. 4—Lightning protection of Martin's substation.

No. 5—Relay and direct-current panel with load-limiting resistors above.



design of 1907. This was a messenger which supported, at intervals of 10 ft., a No. 0000 copper running wire. This was afterward changed by the addition of a No. 0000 galvanized steel running wire which was supported by 2-in. clips under the copper wire. This construction was heavy and rigid, but during its use with the 6,600-volt pantograph collection, the line was remarkably free from breaks, or interruption of any kind due to overhead troubles.

Upon the installation of the 1,600-volt direct-current system it was decided to continue to use the No. 0000 steel running wire, but to remove the No. 0000 copper wire, and to cut the hangers down to two to a span, a spacing of approximately 50 ft. The condition of the old No. 0000 copper running wire was such that its use as a running wire was impractical, and, as the steel wire was in position but practically worthless if removed, it was decided to use it in connection with sliding contact shoes on the trolley poles on the cars. The old copper wire has been moved over to the line poles and used as a part of the direct-current line feeder system. The use of the steel messenger and steel trolley wire necessitates feed taps at every third pole. The construction described above provides an overhead which is sufficiently resilient and flexible to permit the pole safely to follow the wire without undue wear on either wire or shoe.



AT LEFT, THIS IS THE PRESENT TYPE OF EQUIPMENT WHICH IS GIVING SUCH SATISFACTORY SERVICE. AT RIGHT, INTERIOR VIEW OF THE HANOVER LINE PASSENGER CARS

In changing to direct current, consideration was given to stripping the old cars of all their alternating-current equipment, leaving only the apparatus required for direct current. Even though this were done it was found that the cars so revamped would still be approximately 15,000 lb. heavier than new steel Brill cars. It is quickly seen that the energy saving alone would justify the purchase of the new lighter cars, since they have the same passenger carrying capacity and also are able to maintain a better schedule. The transmission has also eliminated the use in the power station of two 450-kw. Westinghouse frequency converters, each consisting of a 2,300-volt, three-phase synchronous motor driving a single-phase, 660-volt, 25-cycle generator.

Taking everything into consideration the installation of the automatic substation is looked upon as the correct solution for that particular property. Schedules have been very closely adhered to and no failures of equipment have occurred, although a few minor adjustments to be expected on any new installation have been made. Besides an increased satisfaction to the public because of a quality of service which has gained its confidence and support, many other benefits are being anticipated. They may be hard to detect at first but will bulk large over a period of several years. Track maintenance must necessarily demand less outlay and attention when the weight of the rolling stock is decreased by more than a third. A lighter car is also bound to have a subtractive effect on the power demand, a condition especially welcomed because the power taken to start the old cars on direct current was very great and the total amount taken within the city was considerable.

Improved Traffic Conditions in San Francisco

AN ACCOUNT was published on page 49 of the issue of this paper for July 9 of the routes on Market Street in San Francisco, on the lower end of which there are four tracks. Two of these belong to the Municipal Railway and two to the United Railroad. The accompanying table shows statistics of the cars and passengers carried during the rush hours on the six lines of the Municipal Railway which operate over this part of Market Street for a considerable distance. The reduction outbound in loading in July, 1921, is attributed, at least in part, to some rerouting carried out in February.

DAILY AVERAGES—SIX HEAVIEST LINES MUNICIPAL RAILWAY FROM MARKET STREET FERRY

Outbound 5 p.m. to 6 p.m.	Cars	Passengers	Average Pass. per Car
November, 1918	85	6,480	76.2
March, 1919	97	8,650	89.2
May, 1920	102	9,336	91.5
February, 1921	109	9,940	91.2
July, 1921	107	8,453	79.0
Inbound 7:35 a.m. to 9:15 a.m.			
October, 1919	139	11,221	80.7
May, 1920	160	11,327	70.8
February, 1921	161	12,001	74.5

Traffic west of the Twin Peaks district on the municipal railway has increased 24½ per cent in cars and 100½ per cent in passengers between March, 1919, and August, 1921. Part of this is due to discontinuance of bus operation and part to an extension of one of the lines.

The super-power report made under the direction of the U. S. Geological Survey now is in proof form and probably will be released for publication shortly.

The Urban Transportation Field Analyzed

The Trolley Bus, with Its Lower Investment and Corresponding Fixed Charges, Is Shown to Be the Most Economical Vehicle to Operate Except Where Heavy Rush-Hour Traffic Has to Be Handled or Where the All-Day Traffic Is Extremely Light

By J. C. THIRLWALL
Railway Engineer General Electric Company, Schenectady, N. Y.

THE recent successful tests of the trackless trolley bus at the General Electric Company's works in Schenectady and on the lines of the Virginia Railway & Power Company at Richmond and Norfolk, Va., have created a demand by railway officials for accurate information as to the conditions under which such vehicles can be utilized to the best advantage and for a comparison of the relative operating costs of rail cars, gasoline motor buses and trolley buses taking electric power from a central station. Thoughout this article the term "motor bus" applies to the gasoline driven vehicle and the term "trolley bus" applies to the vehicle operating on the highway that takes power from overhead wires.

An attempt has been made to tabulate on a comparative basis the respective costs of all three types of transportation under varying conditions of load and frequency of service including fixed charges on the total investment required in each case. An attempt is also made to show the difference in annual costs between a new line or an extension built and equipped at today's construction costs and the re-equipping of an existing route in which the tracks and structures were built at pre-war costs, materially less than now prevail.

A summary of the calculations indicates that for traffic which in rush hours would require safety cars to operate on a three-minute headway or less rail-borne traffic is more economical than the rubber-tired bus, and for the property that has rails, overhead, stations and shops available, which were built at pre-war cost, the rail car can successfully compete with its pavement rivals up to about six-minute minimum headways.

Beyond this point the electric trolley bus appears to have the advantage, since its slightly higher cost of operation is more than offset by the saving in fixed charges on the investment required.

The motor bus, though carrying the smallest investment charges, regardless of traffic density, is inherently so much more expensive to operate that it does not become a competitor of the rail car until minimum rail headways of ten minutes are reached on new routes and of twenty minutes on existing rail lines.

As between the motor bus and the trolley bus, the latter is the more economical up to headways of sixty minutes or longer. Only with very infrequent service do the greater investment charges of the trackless trolley system (covering interest, etc., on the overhead line and stations) offset its lower operating cost.

Tabulated, these costs are as follows, the most economical type of vehicle being indicated for minimum headways:

Rail cars	3 minutes or less
Rail cars or trolley bus	3 to 6 minutes
Trolley bus	6 to 60 minutes
Motor bus	60 minutes or more

Of course, as the tabulations show, the difference in favor of the trolley bus as compared to the rail car operating on headways of seven and one-half or ten minutes to an existing route is too small to warrant even the suggestion that rails and equipment should be scrapped and replaced with the new form of transportation. It is not until minimum headways of fifteen or twenty minutes are reached that the estimated saving of the trolley bus over an existing rail route becomes sufficient to justify such a suggestion.

To illustrate these conclusions and to show the premises on which they are based a number of tables have been prepared and are here presented in which a direct comparison is made of the elements of investment cost for a rail system and for the two types of buses. The actual cost of laying rail in paved streets, of erecting overhead trolley lines or of building power stations, substations or shops varies considerably, of course, as between different localities, but the unit costs taken are believed to represent fair averages for present construction.

AVERAGE INVESTMENT COSTS ASSUMED

For instance, a figure of $60,000 per mile has been taken for single track with turnouts laid in a paved street, $75,000 for single track with more turnouts for shorter headways, $100,000 for a route-mile of light double track for safety cars and $120,000 for a route-mile of heavy track for double-truck cars. In some localities tracks may be laid for less than these figures; in most large cities they would be considerably exceeded, but they are believed to indicate with a fair degree of accuracy the magnitude of the biggest item of investment that can be saved by the use of the rubber-tired vehicle.

Overhead trolley lines using wooden poles with cross spans can be erected for about $5,000 a mile where only one trolley wire and no feeders are required, and for double track, with ordinary feeders, should not exceed $6,000 per route-mile. The double trolley required for the trolley buses costs about $500 per mile more than the ordinary type of construction, $1,000 more per mile when the line is run on both sides of the street. The transmission line is estimated at $3,500 per mile, and it is assumed that the length of the transmission system is one-half that of the distribution lines.

TABLE I—AVERAGE CONSTRUCTION COSTS

Single track per route-mile	$60,000	to	$75,000
Double track per route-mile	100,000	to	120,000
Trolley lines per route-mile	5,000	to	6,500
Transmission line per route-mile	1,800		
Generating station per maximum kilowatt output	125		
Substation (automatic), per maximum kilowatt output	40	to	50
Shops per car used	1,500	to	2,500
Double-truck cars	12,000		
Safety cars	6,300		
Trolley buses	8,000		
Motor buses	8,000		

Generating stations are estimated at $125 per kilowatt of capacity required by the maximum load, including electric heating of cars and automatic substations at $40 to $50 per kilowatt. Shop buildings and carhouses are figured at $2,500 per car for the large double-truck cars and at $1,500 per car for safeties and for buses.

Double-truck cars are assumed to cost $12,000 each, safety cars $6,300 and thirty-passenger buses, either gas or electric, $8,000 apiece.

A summary of these unit cost figures is shown in Table I.

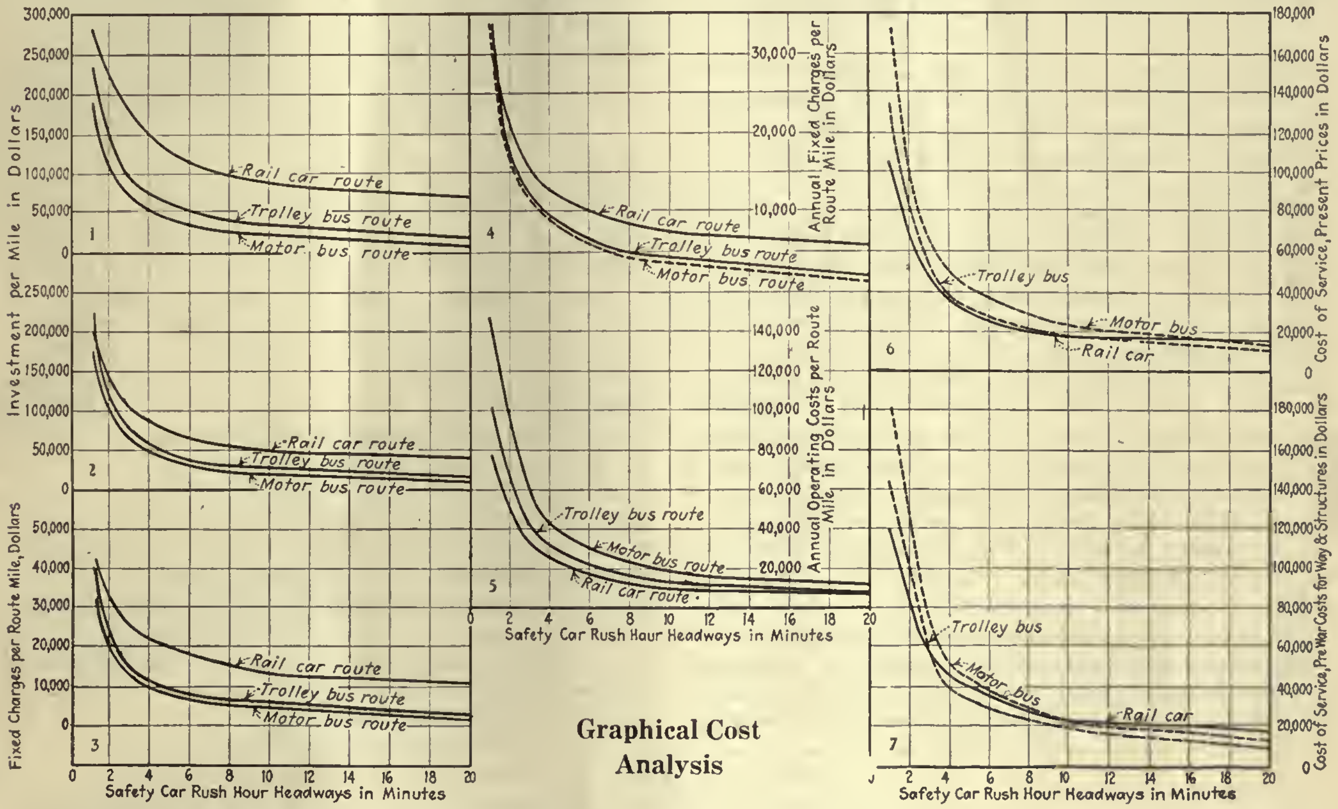
The rail car requires an investment in each of the foregoing items; the trolley bus dispenses with the track, but necessitates the use of all other details, while the motor bus requires only an investment in the vehicles themselves and in storage and shop facilities.

MOTOR BUS HAS SMALLEST INVESTMENT

On fairly long headways, *i.e.*, from eight to twenty minutes, the fixed charges on the rail route will exceed the operating costs, and even on a heavy traffic route they will amount to 40 per cent of the total costs of operating the line. The handicap of these heavy investment charges has given the motor bus its opportunity and enabled the jitneys in many instances to compete successfully with the established traction lines. The motor bus has a higher power bill and a higher maintenance cost than the safety car, and the depreciation of its driving equipment is decidedly more rapid than that of electric motors and control on the rail cars. But even so, for many conditions of traffic, it is the more economical of the two methods of transportation. Its proponents have frequently tried to force it into classes of service where its higher operating costs far outweigh its saving in fixed charges, but it can only continue to operate on selected short-haul routes and where it can evade the responsibilities of good service without attempting to provide the necessary extra equipment for properly handling the morning and night traffic peaks, for which every traction company is expected to equip itself.

OPERATING COSTS COMPARED

Table III is a comparison of operating costs per car-mile of four classes of cars. The rail car data are the average of the actual records of a number of companies using both safety cars and double-track cars; the gasoline bus costs are derived from the records of five representative bus companies shown in Table II. Three of these use small cars seating less than twenty-three passengers; for these the gas and oil costs have been adjusted to a weight of 10,000 lb. and for two companies corrections have been made on the basis of using solid instead of pneumatic tires.



Graphical Cost Analysis

Fig. 1—Present day investment per mile of route for rail service compared to investment for bus service of equal capacity.

Fig. 2—Investment per mile of route for rail service based on pre-war costs for track and structures and present costs for rolling stock compared to the investment per mile of route for bus service of equal capacity.

Fig. 3—Annual fixed charges per route-mile based on present construction costs.

Fig. 4—Annual fixed charges per route-mile based on pre-war costs for track and structures and present costs for rolling stock.

Fig. 5—Annual operating costs per route-mile for rush-hour rail service. Headways compared to bus service of equal capacity. Longer headways during normal hours.

Fig. 6—Total annual operating costs and fixed charges per mile of route based on present construction costs.

Fig. 7—Total annual operating costs and fixed charges per mile of route based on pre-war costs for way and structures and present costs for rolling stock.

In the case of the trolley bus, the allowances for transportation charges and general expenses are assumed to be the same as with the safety car and the gasoline bus; its maintenance of way and structure expense covers repairs and renewals on the overhead trolley lines only; its maintenance of equipment is based on the body and chassis and tire expense of the gasoline car, and motor and control maintenance of the safety car. For instance, safety cars, on an average, cost only 1.7 cents per car-mile to maintain, of which only about 0.6

TABLE II—OPERATING COSTS OF MOTOR BUSES—CENTS PER BUS-MILE

Maintenance	1	2	3	4	5	Average
Tire renewals	2.1	1.0	1.5	4.4	5.6	2.9
Body repairs	0.9	0.6	1.4	0.9	0.9	0.9
Engine, gearing and control	5.7	4.0	4.8	3.3	3.3	4.3
Shop and other expenses	1.9	1.2	1.6	1.0	1.0	1.3
Total maintenance	10.6	6.8	9.3	9.6	10.8	9.4
Gasoline	4.0	5.3	7.1	2.7	4.9	4.8
Lubricants	0.8	1.2	1.5	0.9	1.5	1.2
	4.8	6.5	8.6	3.6	6.4	6.0
All other operating expenses	17.3	19.8	15.9	12.2	10.6	15.2
Total operating costs	32.7	33.1	33.8	25.4	27.8	30.6
Depreciation	3.2	2.4	6.7	9.1	4.9	5.3
Total maintenance with solid tire cost on four and five	10.6	6.8	9.3	7.7	7.5	8.4
Gasoline and oil corrected for 10,000 lb. wt. on 3, 4, 5	4.8	6.5	10.8	5.6	7.7	7.1
Other expenses corrected for one-man operation, 1 and 2	12.2	12.3	15.9	12.2	10.6	12.6
Total operating cost of 10,000-lb. bus with solid tires and one-man operation	27.6	25.6	36.0	25.5	25.8	28.1

NOTE:

1. Chicago Motor Bus Company	1919	10,000-lb. bus solid tires
2. Fifth Avenue Coach Company	1920	10,000-lb. bus solid tires
3. Baltimore Transit Company	1920	7,500-lb. bus solid tires
4. Fort Worth Auto Bus Company	1919	5,700-lb. bus solid rear tires
5. Goodyear Heights Bus line	1920	8,000-lb. bus pneumatic front tires

TABLE III—OPERATING COSTS—CENTS PER CAR-MILE

	Double-Truck Car	Single-Truck Safety Car	Trolley Bus	Motor Bus
Car capacity in passengers	52	32	30	30
Weight in pounds	36,000	16,000	10,000	10,000
Maintenance of way and structure	3.0	2.0	0.7	0.0
Maintenance of equipment	3.4	1.7	4.0	8.5
Power	5.9	2.5	2.3	7.0
All other expense	19.0	12.0	12.0	12.0
Total operating expense	31.3	18.2	19.0	27.5

cents is for repairs to the electrical equipment. The motor buses cost on an average 8.5 cents, of which 2.0 cents goes for the maintenance of solid tires, 1.5 cents for the body and truck and 5 cents for the engine and transmission.

The trolley bus would presumably have the same cost for tires, body and truck upkeep, but only 0.5 cent for the motors and control, making its total maintenance 4 cents per mile, or 4.5 cents less than the gasoline vehicle.

On the power account, due to higher friction, the trolley bus will take more power per ton-mile than the rail car, but its lighter weight will somewhat more than offset this and make its total power cost a trifle less than that of a safety car. A motor bus weighing 10,000 lb. in frequent stop service can make only about 4 miles to a gallon of gas, or 5.5 cents per mile if gas is figured at 22 cents per gallon, and oil and grease add about 1.5 cents to this; it has therefore a total power expense of 7 cents per mile, or 4.7 more than the electric bus.

The depreciation of a motor bus is recognized to be much more rapid than that of a rail car; apparently this is due to the comparatively short life of its engine and transmission. The economic life of a street car and its equipment is at least fifteen years. There is no reason to doubt that the body and truck of any well built bus should last that long. But from all records available, the gas engine and transmission have a life of not over four to five years, and since their first cost is about 25 per cent of the equipped bus, the total depreciation is considerably higher than for the electric car. We have taken them respectively at 4.6 per cent on the rail cars and on the trolley bus and at 8 per cent on the motor bus.

Total fixed charges on the rail system are assumed to be 15 per cent, 9 per cent for interest, 2.8 per cent for taxes and insurance and 3.2 per cent for depreciation on the entire physical property. Since the cost of cars, with their comparatively short life, is a bigger proportion of the total investment in a trolley bus installation, depreciation is figured at 3.7 per cent and total fixed charges at 15.5 per cent. For the motor bus installation, for the above reasons, total depreciation is figured at 6.9 per cent and total fixed charges at 18.7 per cent.

TABLE IV—FIXED CHARGES ON TOTAL INVESTMENT IN PER CENT

	Rail System	Trolley Bus	Motor Bus*
Interest charges	9.0	9.0	9.0
Taxes and insurance	2.8	2.8	2.8
Depreciation (sinking fund)	3.2	3.7	6.9
Total	15.0	15.5	18.7

In the tabulation which follows the upper figures are based on entirely new construction at today's prices, the lower apply to the company which can use track, overhead, stations and shops constructed at pre-war values, assumed to be 50 per cent lower than at present.

In every case except that of "G," it is assumed that a greater number of buses than rail cars would be required for rush-hour service, on the basis that a modern double-truck street car can carry away 120

TABLE V—COSTS PER ROUTE-MILE FOR BUILDING AND EQUIPPING RAILWAY SYSTEM AND

	Case A—Light Traffic			Case B—Medium Traffic			Case C—Moderately Heavy Traffic			Case D—Heavy Traffic		
	Safety Car	Trolley Bus	Motor Bus	Safety Car	Trolley Bus	Motor Bus	Safety Car	Trolley Bus	Motor Bus	Safety Car	Trolley Bus	Motor Bus
Schedule speed (m.p.h.)	9	10	10	9	10	10	9	10	10	9	10	10
Normal headway—thirteen hours daily—(minutes)	15	15	15	10	10	10	7½	7½	7½	5	4.6	4.6
Rush hour headway—five hours daily—(minutes.)	10	6¾	6¾	7½	5	5	4	2.7	2.7	3	2.1	2.1
Seats furnished per hour, normal headway	128	120	120	192	180	180	256	240	240	384	390	390
Maximum rush hour carrying capacity	390	405	405	520	540	540	975	990	990	1,300	1,300	1,300
Cars required, including spares	1.56	2.00	2.20	2.00	3.10	3.33	3.80	5.00	5.40	5.10	6.60	7.00
Annual car or bus miles	58,500	68,200	68,200	84,800	97,600	97,600	127,000	148,800	148,800	182,000	220,600	220,600
Cost of Road and Equipment:												
Trackway—Single track	$60,000	....	....	$75,000	....	....	....	....	....	....	....	....
Trackway—Double track	....	....	....	....	....	....	$100,000	....	....	$100,000	....	....
Overhead system—trolley and transmission	6,700	$6,900	....	6,800	$6,900	....	7,000	$7,400	....	7,500	$7,900	....
Power station and substation	6,000	7,600	....	8,000	10,100	....	14,400	17,600	....	19,300	23,200	....
Shops or garages	2,300	3,000	$3,300	3,000	4,200	$4,500	5,600	7,500	$8,100	7,700	9,900	$10,500
Rolling stock	9,800	16,000	17,600	12,600	22,400	24,000	23,800	40,000	43,200	32,200	52,800	56,000
Total investment	$84,800	$33,500	$20,900	$105,400	$43,600	$28,500	$150,800	$72,500	$51,300	$166,700	$93,800	$66,500
Fixed charges (as in Table IV)	$12,700	$5,200	$3,900	$15,800	$6,800	$5,300	$22,600	$11,200	$9,600	$25,000	$14,500	$12,400
Operating costs (as in Table III)	10,600	13,000	18,800	15,400	18,500	26,800	23,100	28,300	41,100	33,000	42,100	60,800
Total costs per year	$23,300	$18,200	$22,700	$31,200	$25,300	$32,100	$45,700	$39,500	$50,700	$58,000	$56,600	$73,200
Cents per car-mile	40.0	26.7	33.3	36.7	25.8	32.8	36.0	26.5	34.0	31.8	25.5	33.1
On basis of track and structure costs—50 per cent of above.												
Total investment	$47,300	$24,800	$19,300	$58,900	$33,000	$26,300	$87,300	$56,300	$47,300	$99,500	$73,300	$61,200
Fixed charges	7,100	3,800	3,600	8,800	5,100	4,900	13,100	8,700	8,800	14,900	11,400	11,400
Operating costs	10,600	13,000	18,800	15,400	18,500	26,800	23,100	28,300	41,100	33,000	42,100	60,800
Total costs per year	$17,700	$16,800	$22,400	$24,200	$23,600	$31,700	$36,200	$37,000	$49,900	$47,900	$53,500	$72,200
Cents per car-mile	30.3	24.6	32.8	28.5	24.3	32.4	28.6	24.8	33.5	26.3	23.7	32.7

*Seats 52, has a maximum load of 120 passengers and weighs 36,000 lb. With one-man operation costs would be reduced $17,000 per year.

passengers without undue crowding, a safety car sixty-five and a thirty-passenger bus not over forty-five, if the buses are to be kept within the weight and price limits specified. A comparison based on a car for car replacement is obviously unfair, except where the maximum number of people to be carried is within the seating capacity of either type of vehicle.

A number of comparisons have been worked out for different densities of traffic from very light to extremely heavy, each based on a completely equipped line 4 to 5 miles long, and all costs reduced to the unit basis of a single route-mile.

With these prefatory statements, Table V is believed to be self-explanatory. It indicates clearly that the railway is still the most economical means of handling very dense traffic, and that for very short headways there is little to choose in first cost or operating charges between a comparatively small number of large-capacity double-truck cars of modern design and the larger number of safety cars required, as shown in case "E." To handle such traffic as this, headways with the comparatively small capacity buses become so short as to be prohibitive, and their higher operating costs far overbalance their savings in fixed charges.

But for many other conditions, particularly those which are typical of the majority of lines in medium sized cities, where the maximum traffic does not require headways of less than five or six minutes, the trolley bus should save enough in overhead charges to justify its use in preference to either rail car or motor bus.

CONCLUSIONS FROM ANALYSIS

For instance, Table V, Case "A" pictures a very common situation *i.e.*, a line on which an all-day headway of fifteen minutes with a medium sized railway car is sufficient, but on which the morning and evening loads require a ten-minute headway. We assume that safety cars would be used on the rail route and that they would maintain a schedule of 9 miles per hour. If buses were used, presumably they could run somewhat faster due to their ability to run past slower moving vehicles and because of their smaller load in rush hours. The figures are based on a 4.5-mile route, on which the safety cars require sixty minutes for the round trip and the buses fifty-four minutes. Even so, to carry away an equal number of passengers during the rush hours will require eight buses on a 6.75-minute headway as against six safeties, ten minutes apart. One spare car is allowed in the case of the safety car line and for the trolley bus route, and two spares if motor buses are used, because of the greater chance of failure with the gasoline engine.

Power requirements are based on the rail cars taking, at the car, 150 watt-hours per ton-mile, and the trolley bus taking 195 watt-hours per ton-mile, for all energy requirements except heat. These figures are increased 15 per cent for line losses and 25 per cent more for conversion. Heaters are assumed to take a continuous maximum input, on either vehicle, of 12 amp.

Of the total investment required for a new rail line, under these conditions, 60 per cent is saved by using the trolley bus and 75 per cent by equipping with motor buses, and the saving is very material even against the company using old rail and structures. The fixed charges are, therefore, distinctly lower for the bus systems, but the motor buses cost so much more to operate that the total annual cost of the line using them is practically the same as for the new rail road, and 30 per cent higher than for the existing rail system.

The operating cost of the trolley bus, however, is so little more than that of the rail route that it does not offset the savings in the fixed charges, and its total cost of service is the lowest of the three systems.

Another common traffic condition is shown in Case "B," a route that would be satisfactorily handled with safety cars on ten-minute normal and 7.5-minute rush hour headways, and where buses would have to run on a five-minute spacing to give equivalent rush-hour capacity.

Here again the use of the trolley bus is the cheapest way to equip a new line or to extend an old one; the motor bus is the most expensive means.

As the traffic grows more heavy, as in Case "C," the advantage of the trolley bus over the rail car diminishes, but its advantage over the motor bus continues in the same proportion as before. The figures indicate that to re-equip an existing line would show a total loss rather than a gain by abandoning rail operation.

With headways as short as shown in Case "D" rail operation is practically as cheap as trolley bus service,

FOR PROVIDING EQUIVALENT PASSENGER CAPACITY WITH TROLLEY BUSES OR MOTOR BUSES

Case E—Very Heavy Traffic				Case F—Very Light Traffic			Case G—Very Light Traffic			
Double Truck Car*	Safety Car	Trolley Bus	Motor Bus	Safety Car	Trolley Bus	Motor Bus	Safety Car	Trolley Bus	Motor Bus	
8.5	8.5	9.5	9.5	10	10	10	10	10	10	Schedule speed (m.p.h.)
4	2.4	2.15	2.15	20	20	20	30	30	30	Normal headway—thirteen hours daily—(minutes)
2	1.1	0.75	0.75	20	20	20	30	30	30	Rush hour headway—five hours daily—(minutes)
780	800	840	840	96	90	90	64	60	60	Seats furnished per hour, normal headway
3,600	3,580	3,600	3,600	195	135	135	130	90	90	Maximum rush hour carrying capacity
8	14.6	19.4	20.2	0.75	0.75	0.75	0.5	0.5	0.5	Cars required, including spares
243,000	423,000	530,000	530,000	39,300	39,300	39,300	26,300	26,300	26,300	Annual car or bus miles
										Cost of Road and Equipment:
....	....	....	....	$55,000	....	......	$55,000	......	....	Trackway—Single track
$120,000	$110,000	....	....	....	....	......	....	......	....	Trackway—Double track
7,500	7,500	$8,000	....	6,700	$6,900	......	6,700	$6,900	....	Overhead system—trolley and transmission
.64,100	53,900	67,800	....	3,000	2,500	......	2,000	1,700	....	Power station and substation
20,000	21,900	29,100	$30,300	1,100	1,100	$1,100	800	800	$800	Shops or garages
95,900	91,500	154,700	161,700	4,700	6,000	6,000	3,100	4,000	4,000	Rolling stock
$307,500	$284,800	$259,600	$192,000	$70,500	$16,500	$7,100	$67,600	$13,400	$4,800	Total investment
$46,200	$42,700	$40,200	$35,900	$10,600	$2,150	$1,320	$10,100	$2,100	$900	Fixed charges (as in Table IV)
76,100	77,000	100,800	146,000	7,150	7,450	10,810	4,800	5,000	7,230	Operating costs (as in Table III)
$122,300	$119,700	$141,000	$181,900	$17,750	$9,600	$12,130	$14,900	$7,100	$8,130	Total costs per year
50.5	28.2	26.6	34.2	45.0	24.5	30.8	56.8	27.0	30.9	Cents per car-mile
										On basis of track and structure cost—50 per cent of above
$202,000	$198,000	$217,000	$177,000	$37,600	$11,250	$6,550	$35,400	$8,700	$4,400	Total investment
30,400	29,700	33,600	33,100	5,650	1,750	1,210	5,300	1,300	800	Fixed charges
76,100	76,900	100,800	146,000	7,150	7,450	10,810	4,800	5,00	7,230	Operating costs
$106,500	$106,600	$134,400	$179,100	$12,800	$9,200	$12,020	$10,100	$6,300	$8,030	Total costs per year
43.8	25.2	25.4	33.7	32.5	23.4	30.5	38.4	24.0	30.5	Cents per car-mile

even in the case of new construction; on the old rail, it is decidedly more economical.

Case "E" shows a very heavy traffic route, on which could be used large modern double-truck cars, of the Peter Witt type, on four-minute and two-minute headways. It might be practicable to use safety cars on such a route, though the rush-hour headways would be pretty short, but no real advantage would be gained, their total cost of service being practically equal to that of the large cars. If the Witt cars could be operated by one-man, as many operators are coming to believe they can, they will show by far the lowest cost of any vehicle that could be employed.

The enormous number of buses that would be required for this kind of traffic, necessitating headways of forty-five seconds, throws them out of the competition. Their use would not only tremendously increase street congestion but would very considerably increase the cost of service.

The only place where the gasoline motor bus can successfully compete with the rail system is where traffic is so light that headways of twenty minutes or longer afford sufficient service. In cases "F" and "G" the cost of service with the trolley bus and the motor bus on twenty- and thirty-minute all-day headways are compared with a safety car installation operating at the same speed and frequency. With twenty-minute service the old rail route about balances in total cost with the motor bus line; at today's construction expense, the motor bus is distinctly cheaper. At thirty minutes the advantage is decidedly in favor of the gas car. But at either headway the trolley bus will have the lowest total cost of the three, and calculations indicate that its advantage over the gasoline driven vehicle holds up to headways of one hour or longer.

ELECTRICALLY PROPELLED UNITS MOST ECONOMICAL

In conclusion, we believe that there is still a broad field of transportation on city streets for which the rail car is best suited and in which it is the most economical means of carrying passengers, but there is another and perhaps equally important field, in which the trackless trolley bus can furnish equivalent service at a lower cost than can the rail system. Even in comparison with the rail system, the field for the gasoline motor bus is very limited (on headways of twenty minutes or longer), while as compared with the trolley bus, it has no place in a city transportation system, except where it is impossible to erect an overhead trolley line.

But the possibility that the trolley bus holds out of enabling transportation companies to extend their lines into the suburbs or into new sections of a city, with an investment 60 per cent to 80 per cent less than is required for a track system, and to be able to operate cars over the new route for two-thirds of the cost of motor buses, means that an important contribution to the art of transportation has been effected. With these vehicles, it should be possible to extend very considerably the services of the city transportation companies and to benefit simultaneously the traveling public and the electric railway security holder.

[NOTE.—Mr. Thirlwall's article was received prior to the publication of the article on the same subject last week and represents an independent study on the same subject. Mr. Thirlwall has been asked to comment on last week's article and writes that he will do so at an early date.—EDS.]

The "Rail-less" Car

J G. Brill Company Has Developed the "Rail-less" Car, Which Utilizes a Novel Current Collector—Foot-Operated Master Controller System Used

AFTER an exhaustive study of existing vehicles begun some months ago the officers of the Brill Company recently started experimenting for the purpose of developing a type of "rail-less" car which in their opinion would meet the requirements of American transit interests. These requirements called for furnishing economical transportation under more or less special conditions. A short 600-volt d.c. double-wire line was ultimately erected in the Philadelphia plant and an experimental vehicle constructed, the flexibility of which is shown in the accompanying illustrations, as well as the ease with which it can get around other automobiles and trucks on the street.

CURRENT COLLECTOR AND CONTROL SYSTEM

These experiments made it apparent that the success of the vehicle depended primarily on the overhead current collector and the control apparatus. Several different types of current collectors were tried but in each case were found unsuitable. The design of the collector last developed and which apparently will give the best results is shown in the accompanying illustration. An examination will show two under-wire sliding shoes with grooves which engage the two overhead wires when directly over the center of the car. This device ingeniously includes a series of pivots which facilitate action in every direction, longitudinal, vertical and horizontal, as the "rail-less" car deviates from a path directly under the wires. A wooden trolley pole 19 ft. long is used in conjunction with a standard trolley base arranged to exert a total spring pressure of 38 lb. on the two overhead wires. This pressure has been found to be sufficient to keep both shoes of the collector in position as long as the car is not more than 16 ft. off center.

POWER CURRENT OUTSIDE CAR BODY

All electrical equipment controlling the 600-volt power current is located underneath the car body. Therefore, in case of a blowout in the electrical equipment there is less liability of danger to passengers. The current relay contactor system which was designed by Cutler-Hammer Company is operated by a foot master controller, located on the floor in front of the driver's seat, and interlocked with a reversing switch.

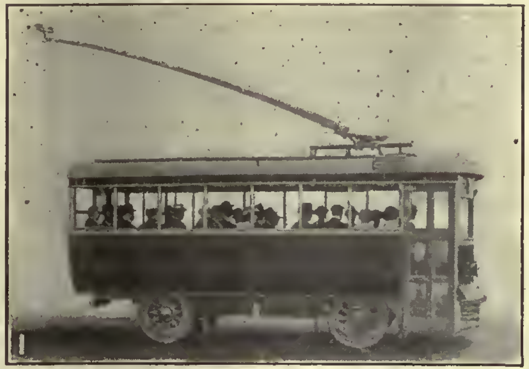
Either one or two 25-hp. motors, connected in tandem, such as used on standard safety cars, may be used on this vehicle, as the contemplated service requires. Such motor equipment permits operation at a maximum speed of from 25 to 30 m.p.h. Motors are mounted directly

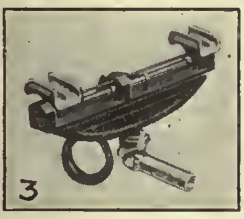
Length over all	22 ft. 0 in.
Outside width of body	7 ft. 6 in.
Amount of street space occupied per passenger seat	6.68 sq.ft.
Outside width of chassis	34 in.
Over-all height	9 ft. 6 in.
Height of bus floor from ground	33¾ in.
Tread of front wheels	60 in.
Tread of rear wheels (dual tires)	68 in.
Wheelbase of chassis	120 in.
Body overhang at rear	60 in.
Minimum turning radius (on a loop)	20 ft. 0 in.
Cross-seat centers	29 in.
Weight of body	2,800 lb.
Weight of chassis	3,750 lb.
Weight of electrical equipment	2,000 lb
Weight of accessories	750 lb.
Total weight	9,300 lb.
Weight per passenger seat	332 lb.
Per cent weight on rear wheels	55

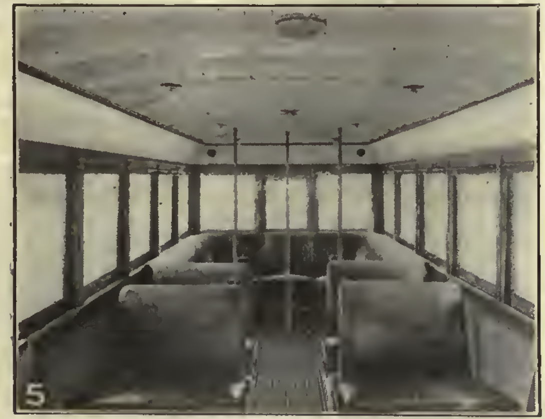
on the chassis frame and drive the rear wheels through a propeller shaft. A Sheldon rear end worm drive is used.

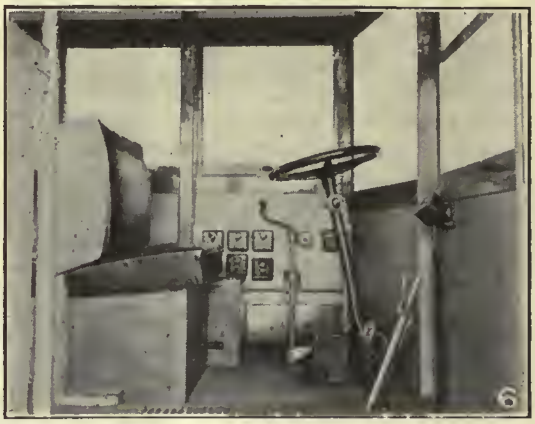
Overman cushion tires are used throughout. Those on the rear wheels are of the dual type. Both the service and emergency brakes are of the internal expanding type, the former being operated by a pedal under the driver's right foot and the latter by a brake handle near his right hand. The chassis and steering arrangement permit the turning of this car within a diameter of 40 ft. without disengaging the current collector from the wires.

In designing this "rail-less" car body particular attention was paid to developing one of substantial construction which would be suitable for rail-less service. A composite underframe was built with the side sills of yellow pine, the end sills of oak and the crossings of suitable steel channels securely tied together with steel angle brackets. This underframe is firmly attached to the chassis. The corner and side posts and the belt rail are of ash with poplar letter panels, all sheathed on the outside with No. 18 sheet steel.









THE "RAIL-LESS" CAR IN PICTURES

No. 1—Seating arrangement shown. Also note method of mounting trolley pole.

No. 2—How easy it is for a truck to pass one by on the road.

No. 3—Current collector for which patents have been applied for.

No. 4—Showing flexibility and ability to load at the curb even with center trolley construction.

No. 5—Interior arrangement. Note the luxurious seat upholstery.

No. 6—Interior at driver's seat. The left foot pedal operates the master controller in front of the steering wheel, the one on the right controls the service brake. The circuit breaker is under the seat.

The plain arch roof is supported on wooden rafters augmented by three steel rafters. Four Brill exhaust ventilators are mounted on the roof.

The two-leaf folding service door, 29 in. wide, on the forward right hand side is manually operated by a suitable handle near the driver's left hand. In opening, this door folds outwardly against the body corner post. Stationary double steps are provided at this door opening. An emergency door, 22 in. wide, is located in the center of the rear end of the body with a hinged step which drops into position when this door is opened. All side and rear windows are fitted with single sash which drop into pockets. This reduces the weight of the car at the roof and lowers the center of gravity.

Another innovation included in this "rail-less" car is a driver's seat, the back of which may be adjusted by means of a simple mechanism to suit the leg length of the operator. It may be set back approximately 3 in. if additional room is required for a tall man or half that distance if that is all that is desired. This seat is stationary and like all other seats is upholstered in Fabrikoid imitation leather. Seating accommodations for twenty-eight passengers are provided. A transverse seat extends completely across the rear end with a single movable section which folds up against the emergency door, a longitudinal seat along the two rear windows on each side of the aisle, four cross seats with 32-in. cushions, a longitudinal seat for two passengers on the right-hand side next to the door opening and a single longitudinal seat behind the driver, all of the stationary type. Figuring 2.5 sq.ft. per passenger the maximum capacity of the bus is fifty passengers. With twenty-eight seats this gives twenty-two standees. The aisle width between the cross seats is 17 in. Three pipe stanchions between the longitudinal seats at the rear are provided for the use of standing passengers.

The interior finish is of natural ash with agasote below the windows.

Current for electric lighting is generally obtained from the trolley circuit, but a storage battery is carried on the floor to the left of the driver's seat for use in case of emergency.

Other details are given in the table on page 550.

Taxation for Railway Construction

Low Street Railway Fares Can Be Provided With the Help of the Landlord—Ample Authority in New York State to Impose a Special Assessment

IN AN ARTICLE which he contributed to the ELECTRIC RAILWAY JOURNAL for Feb. 5, 1921, Louis B. Wehle, a member of the recent Federal Electric Railways Commission, said: "There are cities in which extensions of rapid transit and subway can be paid for, either wholly or in part, out of special assessments upon enhanced property values so that the car fares can remain low and so allow the cities to avoid congestion, while at the same time securing justice to the old investors in the property."

This suggestion attracted much attention, and on request Mr. Wehle has elaborated the idea in an article which appears in the current issue of the *National Municipal Review*. An abstract of this article is published below:

Nobody wants high street railway fares. The company managers are compelled to urge them only as a last resort. If they were sure of low costs, they would much prefer low fares, which mean better and steadier business.

The question is how can low fares be assured? We know that fares must be sufficiently low to enable the cities to follow a normal uniform growth, avoiding congestion. But we know, too, that the service must at the same time insure rapid transportation from home to office or work shop. This means, particularly in the large cities, a continual extension of the rapid transit facilities which do not operate on the street surface. Such facilities are very costly; they entail a high capitalization and have everywhere either caused or threatened to force higher fares. And higher fares can thwart the very purpose of rapid transit extensions, since they will tend to create the very congestion which those extensions are intended to prevent.

THE WAY OUT: ASSESS THE LANDOWNER FOR CONSTRUCTION

From this dilemma there is a plain, simple escape. Not a new remedy, but an old one which has been in use in connection with other public improvements for many years all over the United States, and resort to that remedy has since 1909 been permitted in connection with street railways by the laws of New York State. The question is, when will the American cities adopt it?

When a city builds a new street or a fire hydrant, the landowners along that street or in the vicinity of the hydrant are assessed by the city to pay for it. Public opinion and the courts have approved for generations this procedure with reference to these and other improvements, such as sidewalks, sewers, water systems, parks, and more recently also in connection with electric light systems; and the landowner is thoroughly in accord with it because his is the primary benefit of the improvement, while the benefit to the taxpayer is only a general and more remote one.

So let it be with the rapid transit lines of a large city. Take New York as an example. New York City has pledged its credit to the extent of more than $250,000,000 to build a vast subway system. The companies, in effect, operate the subways on a basis of rentals which pay for them at the end of a long term of years. The fares must be high enough to enable the companies (after first retaining certain earnings for their own account) to pay those rentals. In other words, the taxpayers' credit builds the subways and then these same taxpayers, as car riders, put up the money with which the subways are paid for.

THE FEDERAL ELECTRIC RAILWAYS COMMISSION ON THE LANDOWNERS

But, what of the landowner? He frequently pockets a profit of from one hundred to several hundred per cent on his investment, a profit which the taxpaying and riding public has donated to him. Please read what the Federal Electric Railways Commission said about the New York landowner in its report to the President in August, 1920:

"Your commission would urge that in every community, where and to such extent as may be practicable, consideration be given to the advisability of requiring extensions and rapid transit systems of subway and elevated to be paid for, not out of new capital invested through the medium of bonds or stocks, which means for all time an added burden upon the car rider, but from special taxes assessed against the owners of property in the district the value of which is enhanced by such extensions. The principle is peculiarly applicable to improvements of city transportation systems, because of the enormous increases in real estate values created when new extensions open up new territory or when the creation of rapid transit facilities make outlying territory more available. . . .

"That such a solution is just is rather significantly shown by the fact that in a number of cities, landowners in outlying districts have offered spontaneously to contribute large sums to the company to assist it in constructing certain extensions. The present predicament of the street railway companies is in many places partly due to overbuilding, a fault traceable to political or business pressures exerted by speculators in suburban lands who had little or no financial responsibility in connection with the street railway extensions, which they caused to be built for their immediate benefit. This action of the suburban landowners of certain cities, on the other hand, is a significant expression of enlightened self-interest and a sound, constructive recognition of a fundamental principle of justice. The establishment of that principle by law, whether by changes in city ordinances, state statutes, or state constitutions should, in our opinion, not be delayed. This thought is especially recommended to the attention of a number of communities which are now facing the necessity of extensions or rapid transit improvements."

When the Federal Commission points out that in a number of cities landowners have voluntarily offered to contribute large sums to the company to assist in constructing extensions, we see that the principle of assessing the landowner has developed spontaneously as a resultant of the economic forces involved. The next step is to give to that spontaneous resultant a legal status, so that an obligation to contribute shall bear equally upon all landowners. It will doubtless surprise many to learn that this step has already been taken in the city of New York.

NEW YORK CITY'S NEGLECTED LAW

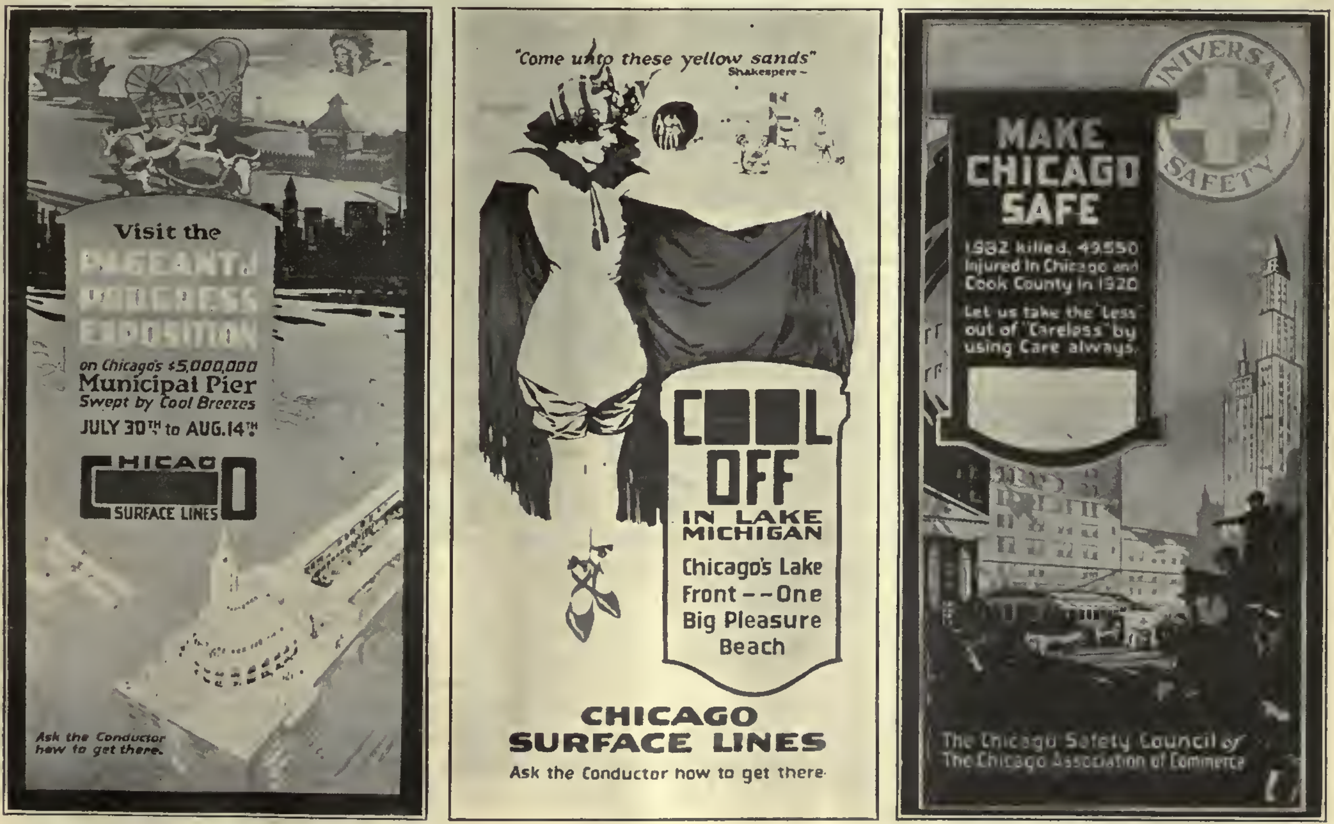
It seems to have been generally overlooked that the statutes of New York today provide in detail permissively for assessing landowners for the cost of street railway construction. The rapid transit act since its amendment in 1909 has provided that New York City may construct rapid transit railroads, paying for them with funds raised by the issuance of rapid transit bonds or of assessment bonds. Such line "shall be a local improvement the cost of bonds of which railroad may be met in whole or in part by assessment on the property benefited." It is then provided that the Public Service Commission, with the approval of the Board of Estimate and Apportionment or other analogous local body, "shall have power to determine whether all or any, and if any, what, portion of the cost and expense necessary to be incurred for any such road shall be assessed upon property benefited thereby," etc. The entire machinery for assessment is fully provided for, and the assessment and interest may be paid in installments over a period of nine years. But this permissive law has never been used. It seems to the writer that it might well be employed as it stands, but that if it were practicable to do so it should be made more just and therefore perhaps more readily acceptable by amending it to provide that the cost of construction be defrayed in the first instance out of a general city bond issue, the determination of benefits to the landowner, and the amount of his assessment being then postponed until some time after the construction of the railway, when the results are largely matters of actuality instead of prophecy.

Stop and consider what it would mean in the future development of New York City if the landowners were to contribute one-fifth of their new land value toward paying for the subway or elevated line which creates that new value. First it would mean a continuance of relatively low fares and even possibly, in the end, a reduction of fares. It would lessen the strain on the city's credit, and definitely eliminate the possibility of certain large tax burdens. Then it would mean an avoidance of congestion with its train of evil consequences and would permit long-range city planning for the public health and welfare.

The subway and elevated extensions needed in New York City today darkly threaten its taxpayers and are a grave challenge to its credit. Daniel L. Turner, at that time chief engineer in the office of the Transit Construction Commissioner, issued in 1920 a thorough analysis and survey of the present and future traction needs of Greater New York. If the extensions are to keep pace with the city's needs, then, according to Mr. Turner, about $250,000,000 of extensions must be built in the next twenty-five years. Even if we should proceed on a far more reduced basis, it seems certain that within the next ten years at least $30,000,000 will have to be spent alone for extensions into new territory on Long Island, where streets have today not even been laid out. Can there be any doubt whatever that the new land values which will be created in that undeveloped territory will be fully as great as those created in 1908 by the extension from 137th Street to Spuyten Duyvil of the Broadway Subway? An assessment system should be devised which will fix upon the landowner in the heart of the city the obligation to contribute by assessment to the construction costs, whether he be benefited by central improvement such as additional trunk-line tracks, or by a suburban extension, and which will fix upon the suburban owner liability not only for the cost of the extension which most obviously benefit his property, but also for the cost of the extra central tracks or tunnels made necessary in the heart of the city by such a suburban extension. It would be a difficult administrative and legal problem to work out the determination of benefits and assessments where so many intangible elements are to be dealt with. Yet scientific handling of the problem can doubtless evolve a system which would equitably place upon the land in the center of the city and upon the suburban owners in large part, if not entirely, the cost of all future main-line and outlying suburban construction. A lien of indeterminate amount would be automatically placed upon the land lying within a certain distance of the improvement; the amount of the actual increase in land value would be determined by appraisal some time after the construction; and the landowner would then be given the option to pay the assessment, if any, in installments over a period of years. "Assessment, *if any*," because in the case of central city property it frequently happens that a rapid transit improvement adds no value and sometimes even impairs value.

Attractive Car Posters for Selling Rides and Emphasizing Safety

DURING this summer the Chicago Surface Lines has utilized some unusually attractive three or more color car posters for calling attention in an inviting way to places of interest and events as a means of inducing car riding. Two of these posters were reproduced in the ELECTRIC RAILWAY JOURNAL for July 9, 1921, page 62, and two more are presented herewith, as well as a third having "safety first" as its theme. Just how many fares were secured as the result of the appeal of these attractive car cards is a matter of speculation, as there is no way to determine. But when one stops to think that approximately 3,000,000 people a day use the surface cars and are almost certain to see the poster, occupying as it does the prominent position in the front and rear bulkheads of every car directly in front of the aisle, the value of this adver-


Visit the
PAGEANT of PROGRESS EXPOSITION
on Chicago's $5,000,000
Municipal Pier
Swept by Cool Breezes
JULY 30TH to AUG. 14TH
CHICAGO SURFACE LINES
Ask the Conductor how to get there.
"Come unto these yellow sands"
Shakespere
COOL OFF
IN LAKE MICHIGAN
Chicago's Lake Front --One Big Pleasure Beach
CHICAGO SURFACE LINES
Ask the Conductor how to get there
UNIVERSAL SAFETY
MAKE CHICAGO SAFE
1932 killed, 49,550 injured in Chicago and Cook County in 1920
Let us take the "Less" out of "Careless" by using Care always.
The Chicago Safety Council of The Chicago Association of Commerce

THESE ATTRACTIVE POSTERS WERE ISSUED THIS SUMMER BY THE CHICAGO SURFACE LINES tising medium will be understood. These posters are so large (18 in. x 36 in.)and so well gotten up that their merchandising value would seem to be very high.

Incidentally, some trouble was had with the trainmen tearing off the lower part of the posters as it obstructed their view through the bulkhead windows into the car. So on each of the cards reproduced herewith holes were cut at a point in the design where they worked in well and at about the level of the conductor's eyes, so that he could see through. This seems to have overcome the objection of the trainmen.

The safety poster was produced by the Chicago Surface Lines in conjunction with the transportation committee of the Chicago Safety Council and was used by the elevated lines and the Chicago, North Shore & Milwaukee Railroad also. The design and art work of all these Chicago posters was done by Barron G. Collier, Inc.

The Electric Railway, Track and All

Sales Managers of the Future Will Make the Electric Railway a 100 per Cent Investment by Selling the Use of Idle Tracks and Equipment

By M. B. Lambert

Manager Railway Department, Westinghouse Electric & Manufacturing Company

THE auto truck and the auto bus and now the trackless trolley bus occupy the center of the stage in the technical and popular press, and hence also occupy much thought in the minds of those interested in their use and sale. This is quite natural and timely for two good reasons: First, these instruments of transportation have demonstrated their utility and economy in the transfer of passengers and goods from one place to another, within well-recognized limitations, and, second, far less invested capital is required for their use, largely because the "people" at large furnish the track and right-of-way almost free of charge. Time, of course, will adjust the latter; steps have already been taken in numerous communities and states toward levying additional taxes or fees on heavy tonnage trucks and auto buses operating regular passenger routes.

The time seems, therefore, very propitious to stop, look and listen and call attention to the old reliable electric railway, track and all, of yesterday, tomorrow and the future. What the auto bus and auto truck and the trackless trolley bus will do or can do is no longer in doubt; they have had a good running start and are well on their way, but the more a great many see of them the more firmly are they turning their heads back with favor on the old reliable street railway, track and all. Visualize the rehabilitated street railway, with light weight yet durable double-truck cars not exceeding 30,000 lb. each, and safety cars for many routes, and instead of the monster girder rails a much lighter construction replacing them, because the lighter cars will not require such heavy rails. With such equipment the operating cost will be far less. The all-around economy, safety, capacity for moving people rapidly and the logic of the whole proposition combined force one to the conclusion that the old reliable electric railway, track and all, is here to stay.

The electric railway, of course, will have a huge debt of gratitude to pay to the auto bus and the auto truck for forcing it to be up and doing its job. As a result of the auto bus and the auto truck, the electric railway will unquestionably take on new life and the development and improvements that it will undergo during the next few years will not only greatly benefit civilization and the electric railway itself, but will also greatly benefit the auto truck and auto bus by helping to create greater usefulness for these vehicles in their respective fields.

The expensive tracks of hundreds of interurban, suburban and city railways are laying idle many hours of the day and night patiently waiting for the transportation salesman to recognize their value and sell their use to the community twenty-four hours each day. The track says to the pavement, when the latter crunches and cracks under the heavily loaded trucks: "I wonder why the city authorities allow you to be broken up while I lie idle here and those heavy loads could roll along on me more silently and with far less cost." The pavement groans back and says: "Wait until next year and the people find out what their taxes are for paving, then perhaps they will realize more fully the economic value of the electric railway, track and all."

The manager in charge of transportation sales of the electric railway of the future will study the whole transportation game and will make the most of every dollar's worth of investment. He will utilize every economical instrument of transportation in its proper field of usefulness, namely, the auto bus, the auto truck, the trackless trolley bus and the old reliable electric railway, track and all. He will study the transportation requirements of the community he serves for both passengers and goods. He will know what the needs of the civic authorities are in the movement of garbage, street cleaning, snow, etc., and jointly with them will establish receiving stations and move these materials in bulk to the dumping place. He will know the traffic requirements of all business houses in the community and, in co-operation with the city authorities, will establish receiving and distributing stations at advantageous points about the city so that all freight will roll over the tracks to these places at night and will be distributed by auto trucks early in the forenoon of each day, and thus will he help the city authorities to solve one of their ever-increasing problems, the congestion of business and pleasure vehicles on city streets.

One of the first things the sales manager of the interurban and suburban line will do naturally is to sell the use of idle tracks and equipment by hauling freight and package goods. The automatic substation and the efficient field control motors on electric locomotives and baggage cars now make it possible and profitable for the management of such roads to make the road work while everybody sleeps so that they will wake up each morning and find their goods ready for use, having traveled two or three hundred miles during the night over the old reliable electric railway, track and all.

Visualizing the whole problem in one broad glance, the electric railway is, after all, nothing more nor less than a very essential and useful tool in community life. Heretofore, only a very limited use has been made of this tool. It can and will be made, by the sales managers of the future, a 100 per cent investment, serving the communities in hundreds of ways, handling passengers and goods more economically, more reliably and more safely, with less congestion and more rapidity than any other instrument of transportation. Then the auto bus, the auto truck and the trackless trolley will fall in line in their proper place, merely as adjuncts or serving tenders to the old reliable electric railway, track and all.

Letters to the Editors

Annual Convention Issue

AMERICAN ELECTRIC RAILWAY ASSOCIATION
NEW YORK CITY, Sept. 26, 1921.

To the Editors:

I wish to extend to you my very sincere congratulations on the annual convention issue of the JOURNAL. I recognize in the keynote of "Salesmanship" the development of an idea expressed by Mr. McGraw in an interview early in the spring.

I think you have done a real job in presenting such a complete picture of the possibilities of merchandising transportation in every department of electric railway operation.

I am sure this will be of great value to the industry generally. It is full of optimism and should be an inspiration to electric railway managers throughout the country.

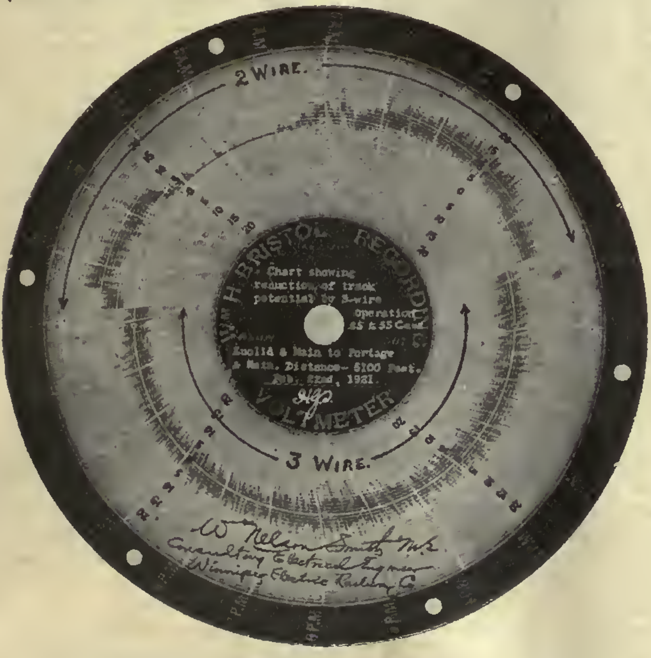
JAMES W. WELSH,
Secretary.

Track Voltage with Three-Wire System

WINNIPEG ELECTRIC RAILWAY COMPANY
WINNIPEG, CANADA, Sept. 10, 1921.

To the Editors:

The accompanying chart may be of interest to some of your readers as showing the value of the three-wire system for reducing track potentials and the stray currents assumed to result therefrom in underground structures adjacent to electric railways. This chart was taken last February at a time when railway loads are usually heavier on account of the severe weather, and the resistance of the earth is at a maximum by reason of its frozen condition, thus diverting less stray current than usual from the rails, and causing the latter to carry more current than during the summer months, thus causing a maximum fall of potential from point to point in the track. It covers about a mile of track carrying the heaviest traffic on the principal business street of Winnipeg.



TRACK POTENTIAL ON MILE SECTION IN WINNIPEG, USING TWO-WIRE AND THREE-WIRE SYSTEM

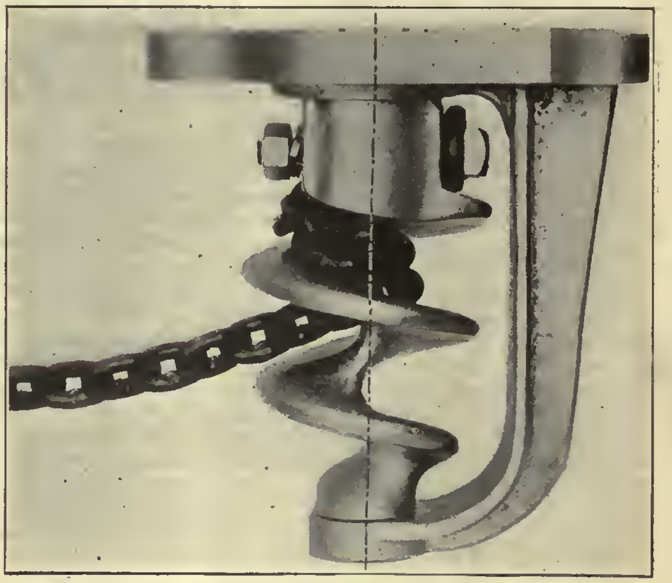
You will notice that during the morning peak, the average track potential drop is 10 volts. During the period of three-wire operation the average is practically zero, and the evening peak is almost imperceptible.

Our system is now completed and we are getting practically this same result over almost the entire city, even to the outskirts.

W. NELSON SMITH,
Consulting Electrical Engineer.

New High-Power Staff Brake

THE Ackley Brake & Supply Corporation, New York City, has developed a high-power gearless staff brake for electric railway service. This is the invention of Lars G. Nilson, and is called the Volute brake. It consists of a grooved winding drum designed for attachment to the lower end of a winding staff. The winding radius of this drum is large at the upper end to provide for quick take-up of the brake chain and tapers irregularly to the lower end. At a point about midway on the drum the effective winding radius passes through zero and the remaining portion of the groove has a slightly negative radius relation.



NEW TYPE OF HIGH-POWER GEARLESS STAFF BRAKE

For any given pull exerted on the brake handle, the tension of the brake chain in winding depends inversely upon the distance of the center of the chain from the center of the staff. With the usual plain winding staff this center to center distance is about 1¼ in. With the Volute design this distance is ½ in. in the brake application range. The Volute drum thus provides a multiplying power of about two and one-half times that of the plain staff brake. This has been demonstrated by both dynamometer tests and in operating service.

The Volute drum is made of cast steel and the deep flanges bounding the chain winding groove provide the necessary strength and thickness and serve to prevent the chain overlapping. The head of the drum is cored out to receive the squared end of the staff and a hole through the head and the squared staff provides for chain attachment. The frame for the drum is also made of cast steel in one piece. The upper top surface is corrugated to provide extra security against slipping when this is bolted to the car platform. The drum is locked in the frame by means of a rust-proof bearing of brass at the top, which fits into the bearing well of the frame and is held by cupping over the well at several points. Slots are cut into the frame portion surrounding the well to shed dirt and keep water away from the bearing.

This type of winding drum provides for graduating both the application and the release of the brake. Following the take-up the chain is on the minimum radius of the drum and therefore the brake handle or wheel moves through a relatively large arc in applying the brake shoe pressure. This graduating feature is also of advantage in preventing wheel locking and facilitating proper coasting.

Some of the advantages claimed for this new type of brake are its simplicity and ruggedness, as there are but three essential parts, the drum, frame and bearing. This design of brake can be adapted to all types and sizes of cars and is the equivalent of a geared brake with a ratio of more than 3 to 1. The weight and cost are much less than that of the geared type of brake as the complete brake with frame weighs less than one-half of the geared type. This type of brake takes very little more space than the plain staff brake and much less than any geared brake, and it can be readily installed without changes in the brake leverage system.

Among other applications of this brake the Atlantic City & Shore Railroad is equipping eighty cars with this type.

Graham Chassis Used in Danbury

THROUGH a misinterpretation of telegrams the type of motor-bus chassis shown in Fig. 3 on page 516 of the ELECTRIC RAILWAY JOURNAL for Sept. 24, 1921, was erroneously credited to the Reo Motor Car Company. The motor-bus body illustrated was built by the Paterson Vehicle Company and mounted on 1½-ton Graham truck chassis, giving very satisfactory service.

Bus Operators Admitted by Amalgamated

81,777 New Members Enrolled Since Last Meeting—351 Written Contracts—Constructive Spirit Evidenced Throughout at Atlanta Convention

THE Amalgamated Association of Street & Electric Railway Employees of America met for its seventeenth convention in Atlanta, Ga., on Sept. 12 to 20. The most striking and important development of this meeting was the expression by various officers of the association of their belief that the interest of street railway employees would be best served by a harmonious relation and co-operation between electric railway employees and the companies for which they work.

The opening meeting of the convention might have been a "get together meeting" between the employees, the officers of the local traction company and the State and city officials.

MEDIATION URGED

The policy of avoiding strikes wherever possible and of accepting mediation and arbitration before resorting to extreme measures was firmly maintained by the association. The association followed recommendations of International President W. D. Mahon, Detroit, and of the general executive board, and sustained very conservative policies regarding disputes with employing companies.

The association voted to urge that provisions for six-day working weeks and eight-hour days be incorporated in future proposed contracts between the organization and employing companies. The importance of educational work both inside and outside the association as a means for improving working conditions and of securing favorable legislation was stressed throughout the convention.

Samuel Gompers, president of the American Federation of Labor, was a visitor to the convention and spoke twice to the delegates. He urged them to keep up their courage during "the present period of industrial stagnation," and during their trials to "hold themselves in leash and move onward and forward gradually and steadily in the industrial development of the country."

In the course of his remarks Mr. Gompers said that union men opposed any reduction in wages because reduced wages result in reduced purchasing power, which in turn would increase the already alarming and increasing amount of unemployment in the United States.

Practically no changes in the major policies and principles of the organization were made at the meeting, and the convention was featured by the constructive spirit evidenced throughout its deliberations. A very important innovation by the association was the recommendation that an old-age pension should be established, for the protection of union members who have retired after twenty-five years of service in the union. Under the recommendations, which will be voted on by the local unions, those entitled to the old-age benefit will receive $800 a year when they retire from active work.

A motion to establish a greater defense fund for use in strikes was defeated, although the association considered the strike of the Troy and Albany traction employees as being just and voted to levy an assessment of 50 cents per member toward a fund to assist these two locals.

Reports showed that the association has enrolled 81,777 new members since the 1919 convention, and that there are now 351 written contracts between employers and affiliated locals. The audit committee announced that there was now a balance of $1,031,535 in the association treasury. The total membership of the organization was reported as about 150,000.

MOTOR BUS OPERATORS ADMITTED

The one-man car question was debated with much interest. The association voted that one-man cars should be fairly and legitimately opposed wherever possible, in order to promote the safety of the public. It was stated that one-man cars are already being abandoned in many cities, and are being replaced by motor buses. A motion to admit to membership street motor-bus operators was carried. The association went on record as advocating the passage of state laws making drivers of vehicles stop, look and listen before crossing interurban roads.

Full approval of the North Dakota State bond issue for co-operative state-owned enterprises was given by the association, and it was recommended that locals and individuals lend their financial support to the movement.

Among the resolutions adopted was one asking that Congress recognize the "republic of Ireland," and another asking President Harding to pardon Eugene V. Debs, socialist leader now incarcerated in the Atlanta Federal Penitentiary. Resolutions were also passed requesting Congress to pass a soldier bonus law.

All business sessions of the convention were closed to the public and the press, a guard being kept at the door at all times. There were 297 delegates present.

The Georgia Railway & Power Company, which operates the street cars of Atlanta, co-operated with the local association members in entertaining the visitors.

W. D. Mahon, Detroit, was re-elected international president for the twenty-ninth consecutive time. W. B. Fitzgerald, Troy, N. Y., was re-elected first international vice-president; P. J. O'Brien, Springfield, Mass., second vice-president; L. D. Bland, Chicago, treasurer, and R. L. Reeves, Chicago, secretary. J. B. Lawson, Shreveport, La., was re-elected chairman of the general executive board at the post-convention session of that body. Delegates to the American Federation of Labor elected were: William Quinlan, Chicago; Fred Schultz, Cleveland, Ohio; James Rogers, New Orleans, La., and A. Conn, Toronto, Ont.

Oakland, Cal., will be the meeting place of the 1923 convention.

Radical Readjustment Proposed in New York City

Transit Commission Suggests, Among Other Things, Unification of Entire Transit System, Ownership by City, Operation by Three Operating Companies Under Management of One Holding Company, Surrender of All Existing Franchises of Whatever Nature

RECOMMENDING municipal ownership of all New York City's transportation agencies but at the same time recommending private operation, the New York Transit Commission has filed its plan of readjustment for New York City street railroads, the report being given to newspapers at 5 p.m., Thursday, Sept. 29, for Friday morning publication. The commission consists of George McAneny, chairman; LeRoy T. Harkness and John F. O'Ryan, appointed by Governor Miller under authority of an act passed by the New York State Legislature last spring. (See ELECTRIC RAILWAY JOURNAL, issues of April 2, 16 and 23.)

Ever since its appointment the commission has been making studies of the situation and the present report has been awaited with keen interest, particularly in New York City, where the traction situation is apparently the principal political issue.

The commission has stated its conclusions of the principles upon which any satisfactory solution to the New York situation can be based under fourteen headings. These are given in the panel on page 560.

The Transit Commission was organized the early part of this year and succeeded to the powers and duties of the former Transit Construction Commissioner. Within a week of taking office, it organized a bureau of valuation and through its bureau of accounts has made a comprehensive analysis of the finances of the operating measures of each of the roads. It will hold a series of public hearings at an early date to determine in particular the attitude of the companies toward the plan proposed, and opportunity will be afforded for criticism and constructive suggestion.

THE SITUATION DESCRIBED

The early part of the report of the commission describes the situation of the transportation lines in New York City, as well as the financial condition of the companies. It declares that on June 30, 1920, the aggregate of the net assets of all the companies was $55,908,893 while the aggregate of the current liabilities was $111,044,653. These included arrears of taxes unpaid, interest on underlying bonds, rentals overdue, and accounts and bills payable. The report says that the spectacle of the city depending on the present embarrassed and generally ill-equipped agencies for a service essential to its daily existence is a sorry one. Moreover, if the roads were fully restored tomorrow, there would be no promise against a recurrence of the conditions of today.

In the judgment of the commission a complete change both in the organization and in the methods of financing the system, as well as its relation to the public, must be effected. To bring about such a change was frankly the purpose of the legislation under which the commission is acting.

NO CHANGE IN FARE

It is the further conclusion of the commission that until there has been ample demonstration of the general results of operation of the new plan and until the changes and economies the plan has in view are tested fully, there should be no change in the present rate of fare. The commission will require, therefore, that the rate for the first year following the initiation of the plan shall remain at 5 cents.

In any consideration of the rate of fare to be charged there should be taken into account the fact that one result of the past three years' policy of inaction has been to hide a substantial increased fare in the present disintegrated and depreciated service. Through the doubling of fares and the elimination of free transfers the net return per ride for each passenger carried on the surface lines in Manhattan and the Bronx has been increased from 3.674 cents in 1918 to 4.342 cents in 1921; in Brooklyn the average of 3.341 cents in 1918 has been increased to 4.415 cents in 1921. In other words, the surface lines in Manhattan, Brooklyn and the Bronx are already receiving a net increase of about one cent per passenger over the net return of 1918.

There has been no such direct increase upon the subway and elevated lines where continuous rides are the rule. There the added cost to the passenger has been in discomfort and loss of time. But even there the payment of the city's deficits through taxation is adding almost exactly one cent to the subway fare. In short, increased fares have not been avoided. They have been secured through indirection.

The commission appreciates that if proper and necessary service is to be restored, and the revenues gained through charging of double fares and the cutting out of transfers given up, this hidden increase must be first absorbed. In other words, savings must be effected that will offset the hidden rate. The commission appreciates as well that various fixed charges must be eliminated, and many costs reduced, to offset further burdens placed upon the present system.

If the present situation were accepted as the basis of fare fixing—a solution the commission declines to consider—without allowance for profits of any nature, preferential or otherwise, the following deficiencies would have to be overcome:

(a) The gross revenues of the operating companies for the year ended June 30, 1921, was in round numbers $133,000,000, and the costs of operation, taxes, rentals and interest, $150,000,000. The deficits, heretofore cited, are therefore........	$17,000,000
(b) The deficits in the interest and sinking fund account of the city which in 1921 amounted to $9,500,000 will advance in 1922 to approximately $10,000,000; the total to be provided from revenue for the city's account, therefore, will be	10,000,000
(c) The cost of eliminating double fares, and of restoring free transfers upon the surface lines will be for each year not less than	9,000,000
(d) And one-third of the cost of neglected repair work and incidental rehabilitation, if this expense can be spread over three years, would add not less than..	5,000,000
The total thus required (without allowance for the cost of restoring full train and car service, which cannot be estimated with any exactness, and without provision for the full replacement of worn-out and obsolete equipment) would be	$41,000,000

Against this sum there may be counted a reduction of $5,000,000 to be secured through the wage adjustments of a month ago. This will bring the net additional indicated need on the present basis approximately to $36,000,000.

$36,000,000 OBSTACLE

It is true that the above figures are based upon the present accounts and financing of the companies. In a rate case the intensive scrutiny of accounts undoubtedly would result in heavy cuts. But the net figure of $36,000,000 indicates the size of the obstacle to be overcome—after three years' policy of drift—to re-establish and maintain the 5-cent fare.

It will appear that if the only method of relief was upon the basis of present organization and financial structure, the prospect for maintaining the 5-cent fare would not be hopeful.

But it is the opinion of the commission that if the reorganization plan it presents be adopted, with (*a*) the rearrangement and more effective co-ordination of the transit system, (*b*) the reduction of rentals and interest charges that it has in view, (*c*) the elimination of taxes and other public charges, from which the municipalized lines naturally would be free, (*d*) the reductions of cost effected through consolidation of power plants and of other facilities used in common, and (*e*) the material savings that will occur in the reduction of overhead and operating charges, the indicated deficiencies may be substantially overcome and the 5-cent fare continued beyond the year of trial.

While naturally every endeavor will be made to attain this end, the question finally can be determined only by a demonstration of the results of operation of the consolidated system such as the plan proposes.

The commission thinks that the enforcement of a plan based upon the principles cited, beyond securing the economies and benefits of consolidation and ending a condition of financial chaos and paralysis, will clean out the separate, special, private interests with their persistent friction and conflicting policies and substitute a new basic organization in which the interests of the city and of private investors would be common. If these principles be recognized and given effect, it will follow that while opportunities for the making of money through the speculative manipulation of transit securities will cease, *bona fide* investors, on the other hand, assured of adequate protection, should not hesitate to lend as further funds are required. The advantages that will flow to the traveling public from the plan are obvious. Nor does the commission see in it any unfairness either to the operating companies or to the present owners of their securities.

In readjusting securities on the basis of honest value which the commission has in view, it declares it will insist upon the elimination of "water" of every description and the frank recognition of a depreciation that investors have long since discounted. In requiring that existing "preferentials" be given up, as a part return for the stability the plan would give to real investment, the commission says it again seeks to cut out whatever has become unstable or artificial in transit finance. Preferential allowances held to be fair and necessary when the dual contracts were negotiated ten years ago are not fair under the conditions of today. If the subway operators argue that their preferentials should be continued, and that a fare should be fixed sufficient to cover them, they would claim in effect that they alone are entitled to 100 per cent protection against the losses and shrinkages of the war, while the city, the private investors and every other party to the old agreements have been required to carry very substantial losses, direct and indirect.

The elimination of inter-company leases will put an end to another form of abuse in transit finance and avoid the continuance of undue favor to any particular class of security holders. Under the plan all such leases would be discontinued and the lines of lessor companies merged with the unified system upon the same terms as to the recognition of actual value and the allotment of interest-bearing securities that apply to all others.

In accordance with the foregoing findings the commission submits the following general outline of its plan and of the mechanism through which it is to be put into effect:

THE PLAN

GENERAL SCOPE AND OBJECT

The plan provides for the valuation, consolidation and municipal ownership of all transportation facilities deemed by the transit commission to be useful and essential. Such facilities are to be acquired without cost to the city by amortizing out of earnings the valuations fixed by the Transit Commission. All existing corporations and their franchises, inter-leases and securities are gradually to be eliminated or extinguished, except such underlying liens carrying a low rate of interest as the commission deems it advisable not to disturb. Existing securities, with such exceptions, are to be replaced by an issue of bonds of a consolidated company representing a fair and honest valuation of the properties. Payment of these bonds with interest, and a sinking fund charge sufficient to retire them within a reasonable period, which will be less than the term of the present subway leases, is to be secured by a purchase money mortgage and assured by a rate of fare based on cost, automatically determined by the condition of a contingent reserve or barometer fund.

Valuations according to existing security issues and present capitalization will be disregarded and the entire financial structure of the consolidated company will be based upon a new valuation, which, under the rapid transit legislation of this year, is rapidly being completed. By this means the "water" in present financing and capitalization will be eliminated and the new valuation will represent the real values in the transportation properties.

In view of the large investment of the city in and its ownership of the existing subway lines, the benefits of a unified system can best be secured through the immediate municipal ownership of all transportation facilities deemed useful and essential in a comprehensive system, and their operation, under effective public control by company agencies to be created for the purpose. If the city authorities shall oppose immediate municipal ownership of the transit system, with its present opportunity to reform completely the existing situation, the commission is prepared to consider the alternative course of vesting title to all properties not now owned by the city, including the subway leases, in the consolidated company, with provision for deferred ownership by the city. Such a course will permit the general features of the plan to be carried out, but will add to the difficulties and tend to impose a higher fare.

CONSOLIDATION

Under the plan, ownership will be acquired by the city without financial outlay on its part. Existing companies will turn in to the consolidated company, and through it to the city, all properties and rights in return for new leases which will provide for amortization out of the earnings of the consolidated system of the valuation fixed by the commission.

The existing, separate systems to be consolidated at the start into three new operating groups to be made up as follows:

Group No. 1: The subway and elevated railroads now operated by the Interborough Rapid Transit Company and leased by it from the city and the Manhattan Railway Company.

Group No. 2: The subway, elevated and surface railroads now or formerly in the Brooklyn Rapid Transit system.

Group No. 3: The surface railroads of the Boroughs of Manhattan and the Bronx.

The surface railroads in Queens and Richmond, in whole or in part, to be allocated to Group No. 2 or Group No. 3, as may be determined.

Bus lines necessary for the logical development of the unified system to be created and allocated as feeders to the foregoing group. Where necessary or desirable, some of the existing surface lines may be transformed into bus lines.

All existing power facilities to be consolidated and operated for the common benefit of the entire system.

To pave the way for the eventual, complete consolidation into one system, and to secure the benefits of private operation under public control, the Transit Commission will cause to be organized four corporations—"A," "B," "C" and "D" companies—each with a nominal number of capital shares.

"A" company will be the controlling and financial company, and general supervisor of the affairs of "B," "C" and "D" companies, which will be exclusively operating companies. The shares of stock of the operating companies will be owned by "A" company, whose shares in turn will be held in trust by the Transit Commission, or by whatever body may succeed it.

"B" Company will operate under lease the properties embraced in Group No. 1, "C" Company the properties embraced in Group No. 2 and "D" Company the properties embraced in Group No. 3.

General financial control and supervision of the entire system will be lodged in a board of control, which will also constitute the directorate of "A" Company. It will consist of seven members, to be chosen as follows: One each by the board of directors of the three operating companies, "B," "C" and "D," three by the Mayor of the city, and the seventh member by vote of the other six, or, in the event of their inability to agree, then by the Transit Commission or by whatever body may succeed it.

The powers of the board of control are to be those of a financial nature, as above indicated, together with such other powers of supervision and direction as may properly be conferred upon it by the contracts to be entered into. It will be responsible for the distribution and management of all the surplus revenues of the operating companies after payment of their own operating expenses, will have sole charge of the issuing of all securities, will make all payments for interest, and have the custody and management of the amortization, contingent reserve, and other funds.

The functions of the Transit Commission in respect to construction should be vested in the board of control, and from time to time, as experience warrants, all the remaining functions of the Transit Commission, except those involving exercise of the police power, to which the Public Service Commission will succeed, should be vested in the board of control, permitting the abolition of the Transit Commission. Legislation to this end will be recommended by the commission.

THE OPERATING COMPANIES

To provide for the eventual consolidation into one operating company, the board of control will have the power, after a specified number of years, to consolidate further the groups and operating companies provided for under this plan into one or two operating companies, as it may deem best.

It may be noted not only that this control differs from past methods, in that it is placed where it can be exercised most efficiently and economically, but that the city's participation is placed on an equality with that of the private investors, giving the city for the first time real and substantially complete home rule with respect to transit.

If, as expected under the plan, selfish and antagonistic interests are eliminated, and the interests of the city and the company investors made common, it should be possible to have a large part of the detail work now done by the staff of the Transit Commission performed by the staffs of the operating companies, and thus cut down the large force of public employees necessary under present conditions. In view of the base of the interests of the city and the company investors being common, the expenses of the board of control should be treated as an operating expense and paid out of railroad earnings.

The operating management of "B," "C" and "D" companies shall be vested in their respective boards of directors under the terms of their leases. The board of directors of "B" Company shall be elected by the holders of the bonds issued in exchange for the securities and properties constituting Group No. 1. Similarly, the directors of "C" and "D" companies will be elected by the holders of the bonds issued in exchange for the securities and properties constituting Group No. 2 and Group No. 3 respectively. Management will thus represent investment instead of speculation

MECHANISM OF TRANSFER OF PROPERTIES TO THE CITY

The present subway leases to be reformed or superseded by agreement, so as to abolish all preferential payments and place company and city investments on a parity. Ownership of all subway equipment not already owned by the city to be vested in the city without outlay by the city in return for a new lease.

The reformed subway leases, comprising the Interborough System, together with the lines constituting the Manhattan Elevated Railroad System, to be assigned and transferred, with the consent of stockholders, or, failing that, by means of foreclosure sale, to "A" Company in exchange for "A" Company bonds, equal in amount to the valuation of the properties of the Interborough and Manhattan Companies, made by the Transit Commission pursuant to Chapters 134 and 335 of the laws of 1921.

These bonds to be exchanged for outstanding securities issued against the properties transferred on terms to be fixed in the final statutory plan and contract, reached if possible by agreement between protective committees of security holders, but otherwise to be determined by the Transit Commission.

Pursuant to the terms of the final statutory plan and contract, "A" Company will forthwith, by appropriate instrument, vest in the city all of its right, title and interest in and to the properties acquired, in return for a lease of the properties transferred, comprising Group No. 1, to "B" Company for operation, under the general terms hereinafter stated.

The bonds of "A" Company, issued in exchange for the properties transferred to it and by it vested in the city, shall be secured by a purchase money mortgage which shall be a specific lien upon the properties transferred and a general lien upon all of the property of "A" Company, including its interest in the leases to the operating companies. These bonds shall bear interest at the rate of five per cent per annum, with an additional one per cent set aside to amortize the valuation as fixed by the Transit Commission. The bonds will be further secured by provision in the final statutory plan and contract for the maintenance of a rate of fare automatically determined to meet at all times cost of operation, bond interest, and one per cent for amortization.

Under conditions hereinafter stated, in order to provide an incentive to efficient and economical management, it will be possible for the bonds to earn an additional one and one-half per cent of interest.

In similar manner the lines now or formerly comprising the Brooklyn Rapid Transit System, surface, subway and elevated (and if it is finally deemed best, the surface lines in Queens and Richmond), will be transferred to "A" Company in exchange for its bonds, equal in amount to the valuation of said properties, as determined by the Transit Commission, which properties shall be by "A" Company vested in the city in return for a lease to "C" operating company upon terms similar to those provided in the case of "B" Company.

In a similar manner the lines now comprising the various surface lines in Manhattan and the Bronx, or such of them as shall be deemed by the Transit Commission to be useful and essential, shall be transferred to "A" Company in exchange for its bonds equal in amount to the valuation of said properties as determined by the Transit Commission, which properties shall be by "A" Company vested in the city in return for a lease thereof to "D" operating company, upon terms similar to those provided in the case of "B" and "C" Companies.

Upon the completion of the amortization period of the purchase money bonds issued by "A" Company, the city's title to all the transit lines will be free and clear of such liens, but the city shall have the right to extinguish the bonds underlying any line or lines at any time after ten years, upon payment of the then unamortized portion of the bonds.

"A" Company shall raise by the issue of notes, or other form of short term securities, sufficient funds for financing the unified system and providing necessary working capital during the early period of its development. Such funds shall be utilized, among other things, for the establishment of the contingent reserve or barometer fund hereinafter provided for. Such additional capital as may be needed for transit construction or equipment, other than that furnished by the city, shall be raised by the sale of new bonds to be issued by "A" Company, as may be determined upon by the board of control.

RATE OF FARE

There shall be no increase in the 5-cent rate of fare, unless, after one year's demonstration of the results of operation of the consolidated system, with its new and many opportunities for substantial economies, an increase is demonstrated to be necessary. Then and at the conclusion of each succeeding fiscal year the rate of fare will be determined automatically by the status of the contingent reserve or "barometer" fund, and shall be put into effect by the board of control. During each year of operation under the plan the rate of fare shall be adequate to provide for cost of operation and interest and sinking fund upon the bonds and other current obligations of the consolidated system, including provision for the maintenance of the contingent reserve or barometer fund.

This will operate as follows:

After payment of operating expenses and fixed charges (the fairness of the amounts of which is insured by the valuation of the properties by the Transit Commission and the control over expenditures by the board of control), the surplus moneys are to be paid into a contingent reserve or barometer fund. If the available surplus keeps this fund above a specified maximum, the fare is to be automatically lowered; if the fund falls below a specified minimum, the fare is to be automatically increased until the reserve is restored.

EXAMPLES CITED

For example: Assume that the normal amount of the barometer fund is fixed at $25,000,000. If it rises to $35,000,000, the fare is to be decreased; if it falls to $15,000,000, the fare is to be increased.

In short, the purpose of this is, after fixing the base of proper valuation and determining the operating expenses and fixed charges, to make the decision as to the rate of fare as automatic as is humanly possible. Upon the new basis the public can be assured that all money expended is properly expended for necessary cost, and the rate of fare, therefore, will reflect the actual and necessary cost of the transportation that the public gets, uninfluenced by any opportunity of private gain based upon stock ownership.

Transfers on all of the lines of each of the three operating systems will be established at proper points as rapidly as financial conditions will permit.

Each operating company will pay its own operating expense and retain its own maintenance and depreciation reserve as authorized by the terms of its lease, and turn over all surplus funds to "A" Company. "A" Company will pool the moneys so received and distribute same as follows:

(a) It shall pay to the holders of its securities the fixed return prescribed, and to the city the interest upon its rapid transit investment.

(b) It shall pay into an amortization fund the specified rate for the amortization of its bonds, and to the Comptroller of the city of New York a specified rate for the amortization of the corporate stock of the city issued for rapid transit construction.

(c) It shall make good any deficit in the cost of operation in any preceding year sustained by any one of the three operating companies.

(d) It shall out of the remaining surplus maintain the above mentioned contingent reserve or barometer fund.

INCENTIVE FOR EFFICIENT SERVICE

In order to provide an incentive for efficient and economical management, there shall be set aside each year by the board of control out of the surplus earnings of the unified system, after the payment of all obligations and the maintenance of the barometer fund, a sum to be distributed or used for the joint benefit of the operating personnel of the unified system and the holders of the consolidated company's bonds. This fund, within the limits of the available surplus, shall, for the purpose of computing allotments prescribed, equal three per cent interest on the purchase money bonds issued by the consolidated company. When the amount so available has been determined by the board of control it shall be allocated, one-half for the benefit of the operating personnel as hereinafter indicated, and one-half for the payment of additional interest upon the outstanding purchase money bonds, but subject to the condition that with any increase or decrease of fare above or below the rate of 5 cents, such funds shall be decreased or increased, as the case may be, on the basis of one per cent interest on the bonds with each cent of fare variation.

In similar manner, out of the remaining one-half of the fund referred to, there shall be allocated under the contingencies mentioned a like amount for the benefit of the operating personnel of the unified system, which allocated sum shall be expended under the direction of the board of control for the collective benefit of the operating personnel.

If, however, the board of control so determines, the said sum may be expended under the direction of the board of control to provide benefits, such as insurance and pensions, for the operating personnel and to reward employees who in various groups have, during the preceding year, rendered conspicuously efficient service.

There will be included in the contracts for the transfer of the several lines to the consolidated company provision for obligations to contract and to creditors and to holders of receivers' certificates of indebtedness, employing for this purpose, so far as can be agreed upon, the bonds and short term securities of the consolidated company, due allowance therefor being made in the price at which the respective properties are to be taken over.

TERM OF LEASES AND AMORTIZATION

The term of the leases shall be for so long as is necessary to amortize the valuation as fixed by the Transit Commission.

All leases to be subject to extinguishment or recapture by the city at the end of ten years upon payment of the then unamortized part of the valuation of the leased properties.

As the amortization funds will be managed by the board of control, on which the city will be adequately represented, their proper and conservative management in the city's interest will be assured. In order, however, to meet the objections to the past management of sinking funds, the final statutory plan and contract will require the adoption of the more clean-cut method of buying or calling in each year a part of the outstanding securities and canceling them. This will wipe out a definite part of the debt each year and, although its cost is somewhat greater than on the compound interest basis, the commission believes that it possesses many advantages. After some years the debt should sufficiently be reduced to ease greatly the cost of meeting fixed charges and thereby pave the way for bettered service or possibly decreased fares.

Fourteen Conclusions of Analysis of Transit Commission on Which Readjustment Plan Is Based

It is the conclusion of the commission that the plan of reorganization should be based upon the following principles:

1. That all existing lines—subway, elevated and surface—should be unified for purposes of future operation, and placed under control of a single supervisory authority in which the operating companies and the city shall participate upon equal terms.

2. That the railway properties still held in private ownership, whether under direct title, franchises, contracts or leases, should, so far as required for the purposes of the unified system, be transferred to the city, their owners receiving in return new securities, based upon the actual value of the lines for operating purposes.

3. That the continued possession of any of the roads for purposes of operation be conditioned upon the acceptance from the city of new leases, granted for restricted periods, and that the revenue derived from such operation be used only for the payment of actual operating costs and the interest and sinking fund charges upon the new securities—plus certain limited percentages of profit allowed when earned as an incentive to good management.

4. That the new securities be amortized in favor of the city, subject to the right of the city to retake any specified one of the lines upon the payment of any then unamortized proportion of the securities.

5. That provision be also made from the revenue of the roads for payment in each year of the interest and sinking fund charges upon the city's investment in the dual subways; as well as upon all subsequent rapid transit investments of the city.

6. That as a condition precedent to participation in the proposed reorganization the preferential allowance of profits granted to any one of the companies as a consideration for rights yielded under previous contracts or leases, as well as any claims based upon the unpaid accumulation of such preferential profits, be given up; and that all inter-company leases or other undertakings covering the use either of lines or equipment be canceled.

7. That the lines retained in the reorganized system be arranged so as to eliminate gradually all duplication of service so that the rapid transit roads will serve the long hauls and the surface cars—or buses—the local and connecting hauls.

8. That only such lines as in the judgment of the commission are adaptable to such a system be acquired, or accorded any value for purposes of such acquisition.

9. That as rapidly as may be possible financially, full and continuous service be restored upon all of the lines, free transfers re-established and postponed repairs given proper attention.

10. That all train and car schedules be so arranged as to provide adequately for the comfort and convenient service of the traveling public at all hours of the day.

11. That in order further to relieve present conditions, and to provide for the great increases of traffic certain to develop in the near future, immediate provision be made for the planning and building of additional new subways.

12. That provision be made for winding up the affairs of the present operating companies at the earliest practicable time upon the basis of the adjustment suggested, for the satisfactory settlement by them of their current liabilities before transfer of their lines to the city and for the termination of all receiverships.

13. That in order to preserve a unified rate of fare on all the lines, all surplus earnings be pooled and that a proper fund be established, to consist of such surplus earnings and such temporary borrowings as may be necessary, to cover current contingent needs.

14. That the rate of fare shall not be fixed, in any discretionary sense, either by the commission, or by any other authority but that it shall be determined from year to year automatically according to the actual costs of operation.

Recent Happenings in Great Britain

British Railways Returned by Government to Owners—Wages Being Reduced—Motor Bus Trip of 300 Miles

(*From Our Regular Correspondent*)

The period of control by the government of British railways came to an end on Aug. 15. As noted in my last article the companies anticipated the change by restoring many pre-war facilities. On Aug. 19 the long and complicated railways bill, which has been before Parliament since last May, received Royal assent and became an act of Parliament. It has little or no bearing, however, on street tramways. One of the clauses authorizes the Minister of Transport to grant orders to railway companies for the requisition by the latter of light railways, but by an amendment which was adopted tramways are specifically excluded from the provision of the clause.

THIS year, like last, the government has failed to carry out its promise to pass into law the electricity supply bill, the plea being want of time. The promise now is to try to pass the measure next year. In this bill the owners of electric traction undertakings have considerable interest. The electricity supply act of 1919 is intended to develop the production and use of electricity for all purposes. Under its powers the Electricity Commissioners have delimited large supply districts and the work is still going on. The scheme provides for the formation of a joint electricity authority for each district, consisting of representatives both of public bodies and of private enterprise. The act, however, was passed in a truncated form, and it contains no powers for the electricity authorities to raise capital for the purpose of developing supply. To remedy this defect the present bill was introduced last year and again this year, but the ordinary parliamentary session of 1921 has come to an end without anything further being done. Until a bill of the sort is passed the act of 1919 will remain a dead letter for practical purposes. A great deal of opposition was aroused to the bill apparently because many representatives of private enterprise think that it will increase the present bureaucracy.

Under the sliding scale agreed on some time ago the first reduction of tramwaymen's wages, amounting to 3s. a week, came into operation during August. This was because the official index figure of the cost of living for July had fallen to 119 per cent above the August, 1914, level. The datum line figure is 135 per cent, and there is a reduction of 1s. a week in wages for every five points of a fall. The latest return shows that the index figure has ceased to fall, but it may resume its downward tendency before the next quarterly revision of wages in November.

The advisory committee of the electrification of railways (appointed by the Minister of Transport) has issued its final report. It confirms and supplements the interim report of July last year. The committee does not seek any hard and fast standardization of plant or equipment, but within limits leaves the railway companies to do what they consider best, subject to the approval of the Minister. Regulations will be issued providing generally for a standard system of three-phase alternating current generation and of direct-current distribution at 1,500 volts from substations, with liberty to use a multiple or sub-multiple of 1,500.

Collection can be either by conductor rail or overhead wire. If a conductor rail is used, it may be either of the top contact or under contact type, and it is to be located 1 ft. 4 in. from the gage-line of the nearest track rail. In the case of the overhead wire conductor its normal situation will be over the center of the track at a height of 3 ft. above the maximum load gage and at a maximum height of 20 ft. above track rail level. No restrictions are placed on the drop in potential in earthed return conductors.

The London street traction authorities, both municipal and company, have succeeded in inducing the Commissioner of Metropolitan Police to reverse his decision that from Oct. 1 no excess passengers would be allowed in tramcars and omnibuses. The police proposal was to go back to pre-war regulations, in spite of the fact that long before the war such regulations had been abolished in most towns in Britain. They are a relic of the horse traction days when cruelty to animals had to be taken into consideration.

A deputation representing both company and municipal undertakings interviewed the assistant commissioner of police in the end of August and pointed out that it is absolutely impossible to run a sufficient number of cars and buses during the morning and evening rush hours to provide seating accommodation for all who want to travel. Some must stand inside or be left behind. It was also shown that the travel habit in London has so grown that it is now the greatest in any city in the world. Moreover, the police have no control as to overcrowding on the underground railways, so that restriction on the tramcars and buses would be unfair. The police promised to give further consideration to the matter and on Sept. 6 the commissioner announced that "straphanging" would be allowed to continue until a sufficient number of vehicles to meet the needs of the public were provided. Probably that means a long time, as it is not difficult to show that the police idea is impracticable. Even if the thing could be done, it would be ruinous financially, as great numbers of vehicles would be idle except during the rush hours.

During the past session of Parliament a number of applications were made by local authorities to enable them to run motor omnibuses both inside and outside their areas. In a number of cases in the past municipalities have been empowered to work omnibuses outside their boundaries. The local legislation committee of the House of Commons, considering schemes of the kind this year, took into consultation representatives of the Ministry of Transport, and the result has been, as shown in a report by the committee, that it has limited the power granted outside a council's area to such routes as would be extensions of or in connection with existing omnibus routes. The Ministry of Transport is to decide on any claims against the municipalities for reconstruction or adoption of roads in the outside areas.

The extent of the development of the motor omnibus in England, during the summer time at any rate, is evidenced by the fact that the correspondent of a daily newspaper has succeeded in traveling all the way from Dover in the southeast of England to Blackpool in the northwest of the country by motor bus, with the exception of fourteen miles which were covered by tramcar. The journey occupied six days and the aggregate of fares was £2 16s.-6d. The distance in a straight line is nearly 300 miles.

A strong effort is being made by Railless, Ltd., for the extension of the use of the system of trackless trolley cars. In the end of August a representative party inspected the installation at York which has been in operation for about a year. One-man cars are used and the service is highly efficient. The system has worked successfully in a few other towns for some ten years, but has not been widely adopted. The York installation, being so recent, is of the most improved type. I mentioned some time ago that the Birmingham City Council is adopting the trackless system on a tramway route which requires reconstruction.

The *in situ* treatment of the tread of tramway rails has been adopted successfully in various places in England, but has not been found to be of much benefit on the London County Council Tramways. It may be recalled that by the alternate application of heat by a flame and of cold by water the tread of the rail is hardened, so that it wears longer. As neither rail nor paving has to be disturbed, the process has been called the *in situ* treatment. The London tramway undertaking differs from most others in the fact that the magnetic track brake is used as a service brake. The result is that at stopping places where there is a frequent service of cars the rail-tread becomes sufficiently heated by the track brakes to destroy the special tempering produced by the *in situ* process, so that the metal in the top of the rail reverts to something like the temper it would have if not so treated at all.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Elevated Road Urged

Proposal at Detroit Referred by Council to Its Street Railway Commission—Trackless Trolley Tested

The City Council of Detroit, Mich., has decided to submit the proposition of the Michigan Elevated Railway to the Street Railway Commission for a decision as to the feasibility of the plan and a possible route, with a view to making the elevated line part of the municipal system eventually.

The president of the elevated company appeared before the City Council asking permission to erect an elevated line on Elizabeth Street from the Michigan Central Depot to Woodland Avenue, a distance of about 1½ miles. It was claimed that cars could be operated over the distance proposed in four minutes and that the elevated company could operate on less than a 5-cent fare.

Members of the Council cited the fact that that body was without authority to grant permission for the construction of the elevated line since the city is empowered to build only surface lines. The matter will be cleared up somewhat at the November election since the proposed charter amendment if passed will give the city power to engage in transportation by methods other than surface lines. It was further cited that inasmuch as sooner or later the city railway system will be entirely controlled by the city, it would be better to await the result of the vote on the charter amendment to make sure that the city will have power to acquire the elevated system before granting the permission. The Mayor had decided to abide by the decision of the Council if the plan was approved.

The village of Ford, one of Detroit's down-river suburbs, is without street car service to Detroit, the Detroit United Railway having stopped operating its cars through the village at midnight, Sept. 22. The company's franchise in the village expired last March and when the company failed to grant the demands of the village for more frequent car service, an injunction was obtained restraining the company from operating through the village. Service was stopped by the company before the injunction went into effect. Officials of the village stated that since Detroit would sooner or later have municipal ownership, they did not want to be involved with a thirty-year franchise granted to the company while Detroit is willing to take over the system. If some satisfactory arrangement is not reached by the company and the village by Oct. 13, the company will be required to remove its tracks.

In a statement attributed to E. J. Burdick, assistant general manager of the Detroit United Railway, it was pointed out that the company had endeavored to reach an amicable settlement, and in good faith offered to operate according to the village's demand for the period of one month, during which time the traffic might be checked. This offer was rejected by the village. The company feels that the village's action is not in accord with the wishes of the majority of citizens.

A new type of trackless trolley has been tried out on a stretch of the muncipal line on Harper Avenue in Detroit for municipal street railway officials. It was demonstrated by the Trackless Transportation Company, New York, and known as the Imperial Omnibus.

Arbiters Uphold 60-Cent Rate

Employees of the Schenectady (N. Y.) Railway were upheld in their wage contention when former Mayor J. Teller Schoolcraft, chairman of the board of arbitration, announced on Sept. 22 the board had decided upon a wage of 60 cents an hour—the scale before the company put into effect, on June 1, a 25 per cent cut.

The decision holds that the 60-cent rate shall prevail in Schenectady as long as the company receives a 7-cent fare. Under the decision of the arbitrators, nothing but a reduction in the company's revenue through lowering of the fare would justify a wage cut.

The men submitted the wage question to arbitration last June, accepting the decreased rate of 45 cents an hour with the understanding that if they should be granted more than 45 cents, the award should date back to June 1. About 600 employees are affected. It is said the back pay will amount to more than $75,000.

The decision is based wholly upon a letter which former General Manager James P. Barnes, vice-president of the Louisville (Ky.) Railroad, is said to have submitted to union officials in May, 1920, guaranteeing 60 cents an hour in consideration of the increase in fares to 7 cents on Schenectady lines. This letter was introduced in evidence at the hearing and was held valid. The majority of the arbitrators held the agreement should be binding upon the company until rescinded.

It is apparent from the decision and opinion of the majority that no weight was given to other evidence introduced, such as living costs and increased costs of operation and maintenance. Both sides agreed to abide by the decision at the time the question was submitted.

The scale on the United Traction Company's lines in Albany, Troy, Watervliet, Cohoes and Green Island now is 45 cents.

Philadelphia Wages Cut

Present Reduction One Cent an Hour—This and Previous Cut Save Company Large Sum

The employees of the Philadelphia Rapid Transit Company agreed on Sept. 24 to accept a reduction in wages of 1 cent an hour. The cut will become effective on Oct. 1. The Co-operative Welfare Association, the employees' organization, computed the amount of the drop and fixed the effective date.

This is the second wage cut accepted by the employees in five months. On May 1 they agreed to a reduction from 72½ cents an hour to 65 cents. The last drop represents an 8-cent decline in the hourly rate from the peak wage standard set in the post-war period. The cut now about to go into effect was delayed from Aug. 15 to Oct. 1 to compensate for the delay in the wage adjustment upward occurring at the time of the earlier advances in the war-time period.

An official statement made by the company says:

> The Buffalo wage adjustment was in general 5 cents an hour for all hourly rate occupations. Under the four-city average a reduction of 5 cents per hour in one city would represent a reduction of 1¼ cents applied to Philadelphia, but as we have not observed the fraction of ¼ cent an hour in our rates of pay, the reduction in Philadelphia on account of a 5 cent reduction in one of the four cities would be made 1 cent per hour.
>
> In the monthly rate clerical occupations in the general offices and also in the clerical and supervisory monthly rate occupations at the depots, shops, yards, etc., in Buffalo these occupations did not participate equally with the trainmen and other operating department occupations in the war-time wage increases, so that the adjustment at this time in these rates in Buffalo is less than the reduction in the hourly rate occupations and was fixed generally at $5 or $2.50 per month.
>
> Reductions of $5 or $2.50 a month in one of the four cities would, under the four-city average, produce a monthly reduction in Philadelphia of $1.25, or 62½ cents respectively. P. R. T. adjustments in monthly rate occupations have been made by the $5 unit, and while it may at any time be decided that a smaller unit, say $2.50, would be proper, yet in this instance where the monthly reduction would be but $1.25 or 62½ cents, the clerical and supervisory monthly rate occupations should not at this time be reduced as a result of the recent Buffalo wage reduction.
>
> Resolved, That in accordance with the wage reduction of 5 cents an hour made effective in Buffalo on Aug. 15, 1921, the hourly rate occupations in Philadelphia be reduced 1 cent an hour, effective on Oct. 1. 1921.

The rate of wages in Philadelphia is governed by the standard in four other cities—Buffalo, Cleveland, Detroit and Chicago. The average in those cities fixes the wage paid in Philadelphia.

Trackless Trolley for Windsor.—The Hydro-Electric Power Commission of Ontario, in response to a demand for extensions to the electric railway system at Windsor, Ont., purchased two years ago from the Detroit United Railway, has decided to try out the trackless trolley.

Women Demand Settlement

Insist That Electric Railway Service Shall Be Restored in Des Moines at Once

Business women in Des Moines, Iowa, took a hand in the railway muddle during the week ended Sept. 24, when a group of them went before the City Council with a demand that the Council take some action to relieve the situation at once. The delegation representing the ladies had more than 5,000 signed ballots expressing the wishes of that number of business women and school teachers as to the settlement of the traction problem.

The ballots asked for an expression on four different phases of the transportation question in a canvas lasting two days, 5,538 ballots were secured, and of this number all but nineteen voted for the re-establishment of electric railway service. Only sixty-six voted for buses as against street cars and 238 expressed themselves as being against an immediate 8-cent fare. As to the question of the immediate re-establishment of electric railway service 99 were opposed while the remainder felt that the need was critical.

Miss Luella Clark, spokeswoman for the delegation, told the Council that Des Moines "is facing its most critical situation now." She said:

> We have been exposed to unusual and extraordinary risks until we are tired of it. The buses are inadequate. What we women want is adequate and decent transportation at once regardless of any desire of Mr. Harris to make us wait, or of any group of business men to teach us a lesson.
>
> We have believed that you were not certain of the feeling of the majority of persons who were dependent upon city transportation, and that is the reason that this vote has been taken. Ballots were distributed to women who work downtown and to school teachers to secure tangible expressions as to the feeling of the women.

At the conclusion of the address to the Council by Miss Clark she and the twenty-five women who accompanied her were told that a determined effort would be made to start cars as soon as the franchise has been voted upon by the Council. It was the opinion of the Council that there were possibilities of appealing to Judge Wade to order restoration of service at the time the Council acted upon the franchise.

Corporation Counsel Miller was called out of a sick bed to attend the Council meeting. He told of a three-hour conference attended by M. Haddon McLean, president of the Des Moines City Railway; J. G. Gamble, attorney for the company, and himself, at which the financial provisions of the proposed franchise were discussed.

Judge Miller outlined to the Council and the business women the franchise situation as it exists today and stated that it will require $1,500,000 available immediately to place the company in a position to restore service in full at once. Judge Miller also called the attention of the delegation to the fact that without an order from Judge Wade of the Federal Court the Council was powerless to restore service.

After waiting upon the Council the delegation of women visited F. C. Chambers, general manager of the railway, and placed their case before him. Mr. Chambers was unable to give the women any definite encouragement as to restoration of service before the franchise difficulties were ironed out.

Union employees of the company indicated that they would contest certain provisions of the franchise suggestions made by Corporation Counsel Miller, particularly the arbitration clause and the one-man-car clause. Objection filed with the City Council by C. C. Putnam, attorney for the executive committee, proposed that the old arbitration clause be inserted in the new grant or that acceptance of the current contract between the company and the men, be made a condition of the franchise.

United Traction Strikers Appeal Contempt Judgment

John F. and William H. Murray have taken an appeal to the Appellate Division from the decision of Justice Charles E. Nichols adjudging Henry Carrigan and John Carr, former employees of the United Traction Company, Albany, N. Y., guilty of contempt of court. They were charged by the company with wilfully disobeying the injunction order granted by Justice Harold J. Hinman forbidding striking employees from interfering with the present workers, patrons or property of the company.

It was alleged they assaulted one of the men who has been on strike after he returned to work in Cohoes. The case was heard by Justice Nichols in Schoharie County. Carrigan was fined $100 and Carr $50, each to serve thirty days in jail if the fines were not paid. The Appellate Division expected to adjourn on Sept. 27 and it is improbable the appeal can be heard at this term.

Stone & Webster Approve Franchise

The proposed franchise for the Houston (Tex.) Electric Company meets with the approval of the Stone & Webster management and if the people should approve of it at the coming election on Oct. 4, the company will immediately begin improvements to the system amounting to $1,000,000.

This statement was recently made by Luke C. Bradley, district manager at Houston. Mr. Bradley said that though there was financial depression he believed that the company could borrow the necessary money and that securities would be offered for sale which would establish co-operation between the people of Houston and the city in the development of its electric railway.

As referred to in the ELECTRIC RAILWAY JOURNAL of Aug. 27 the new franchise provides for certain changes and an extension of fifteen years from 1935. Valuation of the property of the Houston Electric Company has been placed at $6,000,000 plus any capital expenditures since March, 1920. The new franchise provides for earnings of 8 per cent on agreed valuation.

Disagreement Delays Franchise Settlement

While the possibility still exists that some way will be found to get the Grand Rapids (Mich.) Railway out of the difficulties that beset it, the Council and the company appeared on Sept. 22 to be deadlocked over the matter of the valuation to be included in the new franchise for the company first taken up for consideration last February.

The city persists in sticking to a historical valuation of $4,634,757 with enough additional as going value to bring the total amount up to $5,076,000. This figure the company considers wholly inadequate. In a spirit of helpfulness the railway pruned its original figure to $6,500,000 and then to $6,270,000 as a final value. Thus the city and the company are still more than $1,000,000 apart. The alternative has been proposed of submitting the matter to the Railroad Commission for decision, but the need for immediate action would seem to preclude this proposal being accepted, particularly as the commission would probably have to go over the whole case.

L. J. De Lamater, vice-president and general manager of the company, insists that the railway shall be allowed a valuation that will at least cover the bonded indebtedness. If the company is granted a new franchise it will agree to pay no dividends on its common stock for three years. It is now behind $350,000 in the payment of dividends on the preferred stock. As to the financing necessary at the present time, the company is willing to submit its financial program to the city for approval.

The suggestion has even been made by Mr. De Lamater that the city purchase the road or that it take over the property, operate it at a 5-cent fare and make up any deficit in expenses by a charge against the taxpayers as a whole.

The City Commissioners ignored this proposal at the session of that body at which it was made. Mr. De Lamater said he realized that the proposal was an unusual one, but that "looking on it in a business way it is after all a practical idea."

Wage Conference Suggested at Richmond

Thomas S. Wheelwright, president of the Virginia Railway & Power Company, Richmond, Va., has addressed a letter to the members of local Amalgamated Association notifying them that he could not obligate his corporation to continue the present wage scale agreement for another year and suggesting that they appoint a committee to confer with him regarding a new contract.

The company now pays conductors and motormen from 43 to 47½ cents an hour on cars requiring both a conductor and a motorman, and 52½ cents an hour to the operator of a one-man car. A beginner gets 43 cents an hour and 47½ cents after he has been in the employ of the company one year.

Transportation Costs Sought

Massachusetts Body Inquiring Into Matter Under Instructions From Last Legislature

In its effort to determine the comparative cost of different methods of transportation of passengers over the public highways, which the Legislature has instructed it to investigate, the Massachusetts Department of Public Utilities held its first public hearing at Boston, Mass., on Sept. 22. The hearing went into generalities, in which the Public Utilities Department itself and the electric railways were charged with having stifled the jitney service.

The principal aggressor was Senator Gardner W. Pearson, Lowell, who contended that the Public Utilities Department was responsible for "the breaking down of the street railway system in Massachusetts." Chairman Henry C. Attwill of the Commission sought in vain to draw some supporting specifications from the speaker.

Only one witness dealt with facts and figures, and after he had spoken the commission closed the hearing, without announcing what form its investigation will take in the future.

The expert testimony offered was by Clarence W. Kellogg, Stone & Webster Company. He discussed mainly the question of safety cars and pictured the different situations which call for various forms of transportation, such as the rapid transit system, the electric railway, the trolley bus and the motor bus, or jitney. His principal point was to show that in its proper place the one-man safety car, shows relatively fewer accidents and a lower cost of settling accidents than the average two-man car. The decrease in accidents per 10,000 miles amounts, he said, to 31.7 per cent.

Mr. Kellogg said that from a study made of seventeen companies carrying 240,642,000 passengers in eleven States, where there were almost as many miles operated by one-man cars as by two-man cars, the number of accidents per 10.000 miles was 3.69 on the one-man cars and 5.40 on the two-man cars. The average accident cost per 1,000 miles on the one-man cars was $14.77 as against $16.06 on the two-man type.

These figures on safety seem contrary to the prevailing general idea of the one-man car, and contrary to the argument which operators have used on various occasions against the car. Mr. Kellogg explained that it was but natural to expect more safety on the one-man type car because all the responsibility is thrown upon the operator. There is no opportunity then for divided responsibility, as is the case with two men, where one neglects a detail because he relies upon the other to attend to it. In addition to this the one-man car cannot start before the door is closed, and the door of the car cannot be opened before the car has stopped.

As to cost Mr. Kellogg explained that rapid transit must be provided, with its necessary heavy cost of construction, where the traffic density is great, 65,000 passengers going each way hourly, as in New York. On the other hand the motor bus is the best out in the suburban section where there are only a few passengers to move, because the initial cost of the motor bus is small and the flexibility of the service permits of its use elsewhere between the traffic peaks. Between these extremes there is room for the regular electric railway and the trolley bus and it might be to the advantage of the street railway to use the several types in order that they may be co-ordinated for an economic handling of all the traffic.

Mr. Kellogg presented the accompanying tabulation, which are British conclusions as to the best vehicle for different kinds of traffic. It is based upon extensive studies in England.

Kind of Passenger Traffic		Can *Only* Be Handled Economically by	Is *Best* bandled by	Can Also Be Handled Economically by
Description	Passengers One Way Per Maximum Hour			
Very light	Up to 3,000	Motor bus	Motor bns	....
Light	3,000 to 5,000	....	Motor bus	Street car
Medium	5,000 to 8,500	....	Street car	Motor bus
Heavy	8,500 to 12,000	Street car or train	....	....
Very heavy	Above 12,000	Train	Train	....

Lower Wages in Effect

Wages of the trainmen of the Indiana Service Corporation, Fort Wayne, Ind., were reduced on Sept. 16 as recorded in the ELECTRIC RAILWAY JOURNAL, issue of Sept. 17.

The new scale in cents per hour for two-man and one-man car operators on the city lines is as follows:

First six months	41
Second six months	43
Second year	45
Third year	48
Fourth year	50

This new scale is 100 per cent greater than was in effect in 1914. The maximum pay for the interurban trainmen will be 48 cents over a spread of three years. The accompanying table gives a tabulation of wages in cents per hour paid to Fort Wayne city operators from 1914 to date.

FORT WAYNE CITY LINES

Two-Man Cars	1914	1916	1917	1918	1919	1920
First six months	19	21	23	30	33	46
Second six months	20	21	23	31	34	48
Second year	21	22	24	33	36	50
Third year	22	23	25	34	37½	53
Fourth year	23	24	26	..	..	55
Fifth year	24	25	27	..	..	..
One-Man Cars						
First six months			25	33	36	46
Second six months			25	34	37	48
Second year			26	36	39	50
Third year			27	37	40½	53
Fourth year			28	..	..	55
Fifth year			29	..	..	..

Pay of Laborers Cut

The wages of 300 common laborers employed by the Portland Railway, Light & Power Company, Portland, Ore., were reduced approximately 20 per cent recently, when an arbitration board of three, appointed to settle a dispute between the employees and the company, made a report. The old maximum wage was $4.40 a day or 55 cents an hour for an eight-hour day. Under the new schedule, 47½ cents an hour will be paid to employees who have been in the service one year or more; 45 cents will be the maximum wage for men in service of the company six months; and 40 cents an hour will be the wage of those in service less than six months.

The board of arbitration requested, however, that all men now employed as common laborers who had been in the employ of the company less than six months be placed in the 45-cents-an-hour class. The majority report said:

> The continuance of wages on a war-time schedule unquestionably produces unemployment. This fact was among those considered in arriving at a decision. The majority members of the board believe that general prosperity cannot return until general liquidation has been accomplished and wages, foodstuffs, merchandise, rents and all other basic elements have readjusted themselves to their proper relations. This readjustment must be world-wide.

Suburban Buses Must Serve

By a vote of 4 to 1, the head of the street department alone dissenting, the City Council of Lincoln, Neb., voted Sept. 5 in favor of a suburban bus ordinance which carried as a principal provision the rule that if a bus owner professes to serve he must actually do so. The Council attempts in this ordinance to classify the suburban bus as against the bus running to far-away points and the bus running wholly within the city. There is an ordinance already on the books pertaining to the city buses and there is no attempt to interfere with those coming in from far distant points.

The ordinance provides that suburban bus owners shall apply to the city for a license. They shall answer certain questions and pay a filing fee of $5. If the Council grants the application, the operator shall give eight consecutive hours of service on seven days of the week if the suburban point is within 10 miles of the city. The ordinance will not take effect for fifteen days. This means that the suburban buses now in operation between Lincoln and Havelock and Lincoln and College View may operate through Fair Week.

Wages and Fares Coupled

Mobile Company and Employees Will Put Both Questions Up to Commission in Future

Another railway company—this time one in the far Southern State of Alabama—has found a means of putting squarely up to the public regulating authorities the necessity and responsibility for recognizing the wage problem in connection with a determination of rates. The Mobile Light & Railroad Company, through its president, J. Howard Wilson, has recently concluded a new temporary wage agreement with its union employees, which agreement contemplates a future wage adjustment by the Alabama Public Service Commission, at the same time that body undertakes to fix a new rate of fare.

TEMPORARY SEVEN-CENT FARE

The Mobile Company is at present operating on a temporary 7-cent cash-fare basis, with tickets at 6 cents. This rate was granted for two years, which period will expire on April 14, 1922. At that time it will devolve on the commission to fix a new fare. The law of Alabama requires that rates so fixed shall be sufficient to permit the utility to furnish adequate service, to maintain its plant, facilities and equipment in good order, and to enable it, in addition to other legitimate expenses, "to earn a fair net return on the reasonable value of its property devoted to the public service."

The new temporary wage agreement just consummated, effective from Sept. 1, provides for a reduction in the wage scale of 41, 43 and 48 cents an hour, for first, second and third year platform men, respectively. The previous rate was 43, 45 and 50 cents. The differential for operators of one-man cars was reduced from 5 to 4 cents an hour. Carpenters, machinists and blacksmiths were reduced 6 cents an hour. This scale is to continue in effect until April 15, 1922.

NEW RATE TO BE SOUGHT IN APRIL

Meanwhile, as provided in the new agreement, the railway is to request the commission to fix the new rate of fare to succeed the present one after the middle of April, while the employees are to place their wage question before the same body, requesting it to fix a scale of pay which "will be fair, just and impartial to the company and its employees, as well as to the riding public."

The commission will be asked to give due consideration to the cost of living, and to wage scales in effect in other cities for electric railway employees, and both the company and the employees have agreed to be bound by whatever decision the commission shall arrive at, and for whatever period the commission shall determine.

It is understood that if the Alabama Public Service Commission agrees to undertake the responsibility of fixing a wage scale in this instance, it will be through voluntary action on its part, for there is no provision in the law for such procedure.

Auxiliary Motor Bus Lines to Akron Railway

Announcement is made by A. C. Blinn, vice-president and general manager of the Northern Ohio Traction & Light Company, Akron, Ohio, that auxiliary bus lines are to be established by the company in Akron within a short time. An initial order for three closed steel motor bus bodies has been placed with the G. C. Kuhlman Car Company, Cleveland, Ohio.

It is expected that additional buses will be purchased by the company as rapidly as traffic demands. It is also probable they will be utilized in Canton and Massillon, where the company has side lines connecting with its interurban lines between Uhrichsville and Cleveland.

The buses will seat twenty-five passengers and in addition will have room for ten or fifteen standees. The entrance is on the right hand side at the front. Folding doors and steps are a part of the equipment. The buses are to be lighted by electricity. There will also be a buzzer system with push buttons at each side post. They are equipped with regulation heaters, and fare boxes will be established at the right of the driver against the railing. The color is to be of a maroon with the name of the company in gold letters on each side.

PACKARD-KUHLMAN BUS TO BE USED IN AKRON

The seats are to be upholstered in leather of a dark green color; floors are to be covered with linoleum. Window screens are attached to the bottom of the side and rear windows, all windows having inside curtains. Both cross and longitudinal seats are to be used.

The chassis is made by the Packard Motor Car Company, is to be equipped with approved type of wheels and pneumatic tires. The drive will be left hand. The springs are to be of longer and easier riding construction than used in ordinary commercial service. The cost of the new bus complete is approximately $8,000.

First delivery of three buses is promised by the Kuhlman Car Company within eight or ten weeks.

Omaha Wages Cut

Trainmen Reduced About 12 per Cent Following Suggestion of Railway Commission

The Omaha & Council Bluffs Street Railway, Omaha, Neb., announced a reduction of approximately 12 per cent in the wages of trainmen, effective on Oct. 1. The scale which has been in effect is 53 cents an hour for the first three months of service; 55 cents, next nine months; 57 cents after first year of service. The new scale will reduce those rates per hour to 46, 48 and 50 cents, respectively.

This action by the company is pursuant to a recent recommendation by the Nebraska State Railway Commission. Other reductions will be made in the various departments, with the exception of the clerical staff, whose pay was not materially increased during the period of the war. The company said:

> The Nebraska State Railway Commission suggested, in view of the company's falling off of revenues during the last year, on account of business depression and unemployment, and resulting in a decline of passenger traffic, as an alternative instead of decreased fares at this time, a policy of economy, the prime factor of which is a reduction of wages.
>
> The directors recognized instantly, of course, the force and logic of the commission's utterances, and naturally had not, therefore, been unmindful of what you and everyone has known, that wages everywhere are being reduced from the abnormal war standards.
>
> The reduction is in line with the suggestion of the State Railway Commission, and is based upon the average reduction found reasonable for steam railway employees by the United States Railroad Labor board.
>
> It is a smaller reduction than the average reduction brought about last spring for packing house employees. It is likewise a much smaller per cent of decrease than taken by other employees of Omaha generally and employees generally throughout the industries of the nation.
>
> Compared with reductions in the pay of street railway employees in other cities the reduction made by this company is less than the average reduction, which average, in these other cities is about 15 per cent. In some of the cities street car employees' wages have been reduced as much as 20 to 28 per cent.

Shortly before the war the Omaha company increased the scale for carmen from 28-33 cents an hour to 33-35 cents an hour. Then a further increase was made to 35-40 cents, following which occurred a strike a year ago last winter. Negotiations resulted in another increase to 51-55 cents and a year ago the scale of 53-57 cents was established.

$15,000,000 Development Awaits Change in Public Sentiment

The Virginia Railway & Power Company has begun work on a new dam in the Appomattox River at Petersburg, replacing a very old dam which was abandoned some years ago and increasing the amount of power available in the Petersburg industrial district. This district includes the wonder city of Hopewell, built by the DuPonts during the war. Although Hopewell was a "war baby" it now gives promise of permanent manufacturing stability. The new installation will cost about $75,000.

Some years ago elaborate plans were prepared for the development of the water power in the Appomattox River. It was then proposed to acquire more than 30,000 acres of land to protect the riparian rights, and build one or more large dams some distance above the city, the work to cost in all more than $2,000,000. These plans were held in abeyance during the way period and may be abandoned because the cost of capital to carry out the undertaking is considered prohibitive. To finance the extension now being made it has been necessary to borrow money at 10 per cent, although the success of the undertaking is assured in advance.

Thomas S. Wheelwright, president of the Virginia Railway & Power Company, said on Sept. 27 that the company has for some years had in mind a general plan for the development of water power in the Rappahannock River at Fredericksburg, the James River at Richmond, the Appomattox at Petersburg and the Roanoke at Roanoke Rapids, N. C. Surveys were made of the watersheds of these four rivers to ascertain the average volume of water and the extent of the fall. Preliminary estimates were that the whole cost would be in the neighborhood of $15,000,000, an amount impossible to raise, according to Mr. Wheelwright, until times change and until there is a decidedly different attitude on the part of the law-making and regulatory authorities toward such investments.

Pretentious Bus Proposal Made in New York

A description of 100 bus routes to cover all five boroughs of New York City and over which it is proposed to operate 2,000 buses has been sent to the Board of Estimate by Benjamin Shepard, an attorney, of 154 Nassau Street, acting for Austin P. Fox of the City Transit Company. The company made application for franchises several months ago, and was asked for more specific information as to the routes and the type of bus.

In a letter accompanying the description of the routes Mr. Shepard says the buses can be put in operation within thirty days after approval of the franchise by installing from 100 to 500 buses, and a like number every thirty days thereafter. The fare would be 5 cents on the main lines, with transfer privileges, and 1 cent on each of the four bridge local lines. The average cost of the buses, which would be of single and double deck types, would be $10,000, and the entire outlay for buses more than $20,000,000.

Mr. Shepard would not give the names of those who are to furnish capital for the enterprise.

Vancouver Residents Inconsistent

Following the rejection of a service-at-cost franchise by the City Council of Vancouver, B. C., petitions have been lodged with the Council by residents of various districts for extensions to the British Columbia Electric Railway's lines and improvements to service. The reply of W. G. Murrin, assistant general manager of the company, was that not a cent can be spent on improvements until the affairs of the company are so stabilized that it can raise money. The City Council threatens to put on motor buses. On one of the proposed lines, the first requirement of a motor bus or jitney service would be the paving of a mile of street, an expenditure which the city is not likely to incur at present.

Report of Traffic Survey Made in Nashville

The traffic survey report of Nashville, made by Ross W. Harris, consulting engineer at the instance of the Tennessee Public Service Commission jointly for the City of Nashville and the Nashville Railway & Light Company, has been submitted to these bodies with recommendations and suggestions for the elimination of vehicular and car congestion in the city.

Among the suggestions made were the shorter routing of cars on the longer lines, the elimination of parking of autos on certain narrow streets, the extension and opening of several of the business streets, the rerouting of cars on certain lines, new construction and transition of certain tracks. Mr. Harris said:

> The streets of Nashville in the downtown districts are extremely narrow and afford insufficient capacity to accommodate the traffic as now regulated. It is observed that the parking of automobiles on certain streets in the downtown district has been extensively practiced and thus valuable street capacity is utilized by stationary vehicles greatly to the interference of street car passage and other moving bodies.

Since the report has been submitted the City Council of Nashville has passed a bill prohibiting the parking of autos and other vehicles on certain downtown streets, except during early morning hours to 7 a.m. and late evening hours from 7 p.m. This has helped considerably in giving a freer flow of traffic, thereby enabling the electric railway cars to make routes on better schedule.

In regard to the central transfer station which is in use in Nashville, Mr. Harris points out its advantages, but reports it is inadequate in size properly to serve the public, its facilities having been exceeded by the traffic demands. At the present time all electric railways enter and leave this central station.

Montreal Wage Reduction Held Not Unreasonable

The wage reduction of 12½ per cent put into effect by the Montreal (Que.) Tramways in August is likely to remain in force without further protest from the employees, as the result of the award of a board of arbitrators announced on Sept. 24. The board was granted by the Dominion Department of Labor on the application of the union, the department naming a chairman, the men choosing a representative, and the department then nominating a representative for the company after the latter had failed to take any action to do so.

The hearings before the board consisted entirely of evidence submitted by the men in opposition to the reduction, the company not recogizing the existence of the board in any way.

A majority award made by the chairman, Judge Bazin, and the department-appointed representative of the company, A. P. Frigon, held that in view of lowered living costs the company's financial position and the existing industrial crisis, the reduction is not unreasonable.

A minority report by A. Brossard, K. C., the union's representative, dissented and recommended that the scale in force before Aug. 16 be restored.

Both reports were discussed at a meeting of the union, held after the announcement of the award, and although the men refused to accept the majority award and claimed to be victims of injustice, no definite steps were taken further to oppose the reductions. The prevailing opinion is that in view of depression and unemployment conditions, the operatives will decide to let matters rest as they are.

Insufficient Notice of Wage Reduction

The order of the receiver of United Railways, St. Louis, Mo., reducing the wages of about 125 electrical workers form 10 to 15 per cent below the existing scale of from 55¾ to 84¾ cents an hour, has been held up by Judge Lamm, special master in the United States District Court, who found that sufficient notice had not been given the employees.

It was held that the wage award made to the employees by the Missouri Public Service Commission, sitting as a board of arbitration and effective Sept. 1, 1919, was a contract and could not be terminated by either the receiver or the electrical workers without giving sufficient notice. The receiver had posted a notice in August that the new wage scale would go into effect on Sept. 1. The master held that if a new notice were posted before Oct. 1, the wage cut could become effective on Nov. 1. This notice has been posted.

The city of New York has announced a public demonstration of the trackless trolley between Meiers Corners and Linoleumville, Staten Island, Oct. 8.

Financial and Corporate

Drastic Reorganization

Stockholders and Unsecured Creditors of Interurban Railway Completely Wiped Out

Companies are being organized in both New York and Pennsylvania to take over the properties of the Western New York & Pennsylvania Traction Company sold under foreclosure some time ago. These companies will be merged into a single corporation under the name of the Olean, Bradford & Salamanca Railway. It is expected that the new securities will be available for distribution shortly after Oct. 1, but the plans for the reorganization are subject to approval by the Public Service Commissions of both New York and Pennsylvania.

The reorganization is a drastic one in the sense that if the plan now proposed is carried out, the stockholders and unsecured creditors of the old company will have no interest or share in the new corporation. The entire electric railway property will be owned by the depositing bondholders.

Under the new plan the fixed charges of the new corporation will be substantially reduced. It is proposed to raise $224,000 from the old first and refunding mortgage bondholders, or in the event of their failure to provide the necessary funds, it is intended to sell such securities on the same terms to an underwriting syndicate. The money will be used for such cash requirements as are necessary in connection with the purchase of the property.

As part of the foreclosure proceedings the property of the Western New York & Pennsylvania Traction Company in New York was purchased on behalf of the bondholders' committee at public sale on June 4, and the property in Pennsylvania was similarly purchased on June 15. Of the total of $2,240,000 of bonds outstanding $2,066,000 were deposited under the protective agreement.

The capitalization of the old company exclusive of $1,000,000 of common stock was $4,067,255, consisting of $92,000 of first mortgage bonds of the Olean Street Railway (Bolivar Extension), $136,000 of first mortgage bonds of the Olean Street Railway, $2,240,000 of first and refunding 5 per cent bonds, $599,355 of 6 per cent cumulative preferred stock, and $1,000,000 of 5 per cent non-cumulative second preferred stock.

The capitalization of the new company will total $4,260,000 consisting of $92,000 of first mortgage bonds of the Olean Street Railway (Bolivar Extension), $136,000 of first mortgage bonds of the Olean Street Railway, $224,000 of first and refunding mortgage 7 per cent bonds Series A, $1,120,000 of 7 per cent non-cumulative preferred stock, and $2,688,000 of common stock. Each depositor under the protective agreement dated April 19, 1920, for each $1,000 of bonds of the present company with all coupons attached since Jan. 1, 1920, is to receive $200 of common stock of the new corporation, whether or not the depositor has purchased the bonds and securities of the new corporation, and in addition to receiving the $200 of common stock each depositor is to be entitled on payment of $100 to purchase $100 of first and refunding mortgage 7 per cent bonds, series A; $500 of 7 per cent non-cumulative preferred stock, and $1,000 of common stock.

Toronto Purchase Arbitration Hearings Continued

W. J. Hagenah, Chicago, expert for the Toronto Railway, continued his evidence before the Board of Arbitration last week much along the same lines as the previous week's testimony. Dealing with the value of track and roadbed, Queen Street was given the general value of 70 per cent; the track on Ossington from Queen to Dundas was found to be perfect and set down at 98 per cent of original value, while the average came to 80 per cent. Front Street between Church and Sherbourne, however, was worth only about 20 per cent, from Church to Yonge 60 per cent and from Yonge to York where the track was new it was placed at 95 per cent.

The Gerrard Street line was stated to have a present value of $101,885, with a replacement value of $145,509; its condition was 71 per cent new. Harbord between Spadina Avenue and Bathurst was rated at 75 per cent and 70 per cent west of Bathurst. The whole of the King Street line was averaged at 67 per cent, with a present value of $102,658 and replacement value of $145,041.

At this juncture W. N. Tilley, K.C., one of the city's counsel, suggested that the city of Toronto was not going to accept the basis of cost of labor and material averaged over the last three years as shown in Mr. Hagenah's report. After some discussion between the Board of Arbitration and counsel no decision was reached. Mr. Hagenah resumed his evidence.

All other streets were treated along similar lines, showing a varying percentage from 55 per cent up to 90 per cent. The board then determined to hear argument as to whether or not the three-year basis of cost should be accepted as the manner of determining the value of the railway plant at the time of taking over by the city of Toronto.

The hearing was then adjourned until Tuesday of the following week.

Segregation Details

Toledo Stockholders to Vote on Oct. 10 on New Financial Plan Separating Properties

Facts additional to those noted in the ELECTRIC RAILWAY JOURNAL for Sept. 24 are now available about the plans which will come up for approval at the special meeting of stockholders of the Toledo Railways & Light Company called for Oct. 10 in Toledo to change the name of the corporation from the Toledo Railways & Light Company to the Toledo Edison Company. Since the segregation of the railway properties in Toledo under the name of the Community Traction Company, the Toledo Railways & Light Company has been solely a generating and distributing company for electric light and power and gas. In connection with the change of name the Acme Power Company, operating a large central generating station in Toledo, will be consolidated with the Toledo Edison Company.

The authorized capital stock of the new company will be $15,000,000 of common stock, $6,000,000 of prior preferred 8 per cent cumulative stock and $4,000,000 of preferred stock 7 per cent cumulative. In addition the company will have an authorized amount of $13,500,000 first mortgage 7 per cent bonds, due 1941, and the $1,875,400 of the Toledo Gas, Electric & Heating Company consolidated mortgage 5s, due 1935, will remain outstanding. Upon completion of the financing, the Toledo Edison Company will have outstanding only these two bond issues and will be well supplied with working capital.

Of the stocks of the Toledo Edison Company, the $12,904,000 par value of common stock, or approximately 93 per cent of the outstanding amount, will be owned by Toledo Traction, Light & Power Company, which also will own $1,500,000 par value of the Toledo Edison Company preference stock 7 per cent cumulative series A, $7,925,000, or 100 per cent, of the Community Traction Company first mortgage 6 per cent gold bonds and $500,000 par amount of the Community Traction Company 8 per cent cumulative preferred stock. Of the $6,661,675 par value of Toledo Traction, Light & Power Company preferred, $6,425,410 is owned by the Cities Service Company, and of the $7,966,250 of the Toledo Traction, Light & Power Company Common stock outstanding, 95.71 per cent or $7,624,500 is owned by the Cities Service Company. The Toledo Edison Company properties, as well as those of the Community Traction Company, are under the operating management of Henry L. Doherty & Company.

The Toledo Edison Company has sold to a banking syndicate headed by Harris, Forbes & Company, as syndicate managers, and the National City Company $13,500,000 of its first mortgage 7 per cent gold bonds of the series due in 1941. Those bankers offered the issue at 96½ and interest to yield about 7.33 per cent.

In connection with the financing of

the Toledo Edison Company, the National City Company, New York, and the Union Trust Company, Cleveland, Ohio, have purchased $2,500,000 of the Toledo Edison Company prior preferred 8 per cent cumulative stock, which is now being offered to investors.

Presentation of Reorganization Testimony Completed

Sanction is being sought from the Public Service Commission of Rhode Island to reorganize the Newport & Fall River Street Railway as the Newport Electric Corporation. The company operates the electric railways in Newport, Portsmouth, Middletown and Jamestown and furnishes electric light in these and other places. The petitioners contend that with the reduction in costs now apparent through the operation of one-man cars and as a result of other economies the new company should be able from the start to meet all the obligations imposed under the proposed plan for refinancing the properties.

Permission is being sought for approval of the issuance of $160,000 of 7 per cent notes, maturing as follows: $20,000 on Oct. 1, 1922; $20,000 on Oct. 1, 1923; $20,000 on Oct. 1, 1924, and $100,000 on Oct. 1, 1925, secured by the $240,000 bonds on deposit. Also an issue not to exceed $160,000 of 8 per cent notes maturing Oct. 1, 1927. Of this issue $40,000 is to be paid to the Newport County Electric Company for unpaid interest due on $240,000 of first mortgage bonds which matured on Aug. 1, 1918, and which are now held by the reorganization committee of the Bay State Street Railway. Of the issue $120,000 is to be offered to the stockholders at par in proportion of 10 per cent of their holdings and the proceeds up to $80,000 are to be used to make cash payment on the first mortgage bonds in the hands of the receivers of the Bay State Company.

Frank D. Lisle, president of the company, presented the case before the commission. He outlined in detail the history of the company and its connection with the Old Colony Street Railway and the incidents which led up to the appointment of the receiver of the Bay State Street Railway. He said that the petitioning corporation, the Newport County Electric Company, was the successor of the Newport & Fall River Street Railway, the change of name having been granted at the January session, 1920, of the Rhode Island General Assembly. Mr. Lisle said that under the proposed plan there would be an increase of only $80,000 in the capitalization notwithstanding that the petition called for the issuance of $320,000 in new bonds.

After Mr. Lisle had concluded his statement Chairman Bliss of the commission announced that the matter would be taken under consideration, and requested Mr. Lisle to file certain papers and figures concerning the capitalization and valuation of the corporation and its properties.

Syracuse Going Behind on an Eight-Cent Fare

Figures made public by B. E. Tilton, vice-president and general manager of the New York State Railways, Syracuse Lines, and summarizing operations for the four months ended Aug. 31, showed that the local lines during that period ran short $185,309 of earning surplus, contingencies and the 8 per cent return on valuation fixed by the Public Service Commission.

Total revenues aggregated $745,677, including $717,906 from transportation, and total operating expenses amounted to $648,254, with a net revenue from railway operations of $97,423. Offsetting this apparent revenue was an item of $46,058 for taxes assignable to railway operations, leaving an operating income of $51,365. To this was added the non-operating income of $1,184, bringing the gross income to $52,549.

Offsetting this gross income total is an item for $237,859, representing the amount which should be earned for surplus, contingencies and the 8 per cent return allowed by the commission on the valuation of $8,919,000, fixed by the commission's finding in the 8-cent fare decision April 19 last.

The gross income shown by the report ran short $185,309 of reaching the amount which should have been earned by the Syracuse lines during the four-month period.

This deficiency is charged by company officials to the slump in riding which followed the business and manufacturing depression during the same period.

The receipts for August were $15,111 less than the receipts for the same month last year, despite the 8-cent fare; the receipts for July $12,500 less than the same month last year, while the receipts for June and May of the current year were respectively $1,200 and $30,000 ahead of the receipts for the same month last year. The difference for May is not a fair comparison because during five days in May, 1920, the system was shut down by a strike.

New Jersey Consolidation Disapproved

The application for consolidation of the associated companies of the New Jersey and Pennsylvania Traction Company, operating in Trenton and Princeton, was disapproved on Sept. 24 by the State Public Utility Commission because of the method of the transfer of stock of the companies. The proposed merger included the New Jersey & Pennsylvania Traction Company, the Lawrenceville & Princeton Railroad, the Trenton, Lawrenceville & Princeton Extension Company and the Princeton Street Railway. The New Jersey & Pennsylvania Company is the owner of the other companies, and the consolidation was sought to expedite the handling of the financial and other affairs of the concerns. The parent company has a capitalization of $1,100,000.

The plan of the company in the proposed consolidation was to reduce its $500,000 stock outstanding to $350,000 at par; the outstanding stock of the Trenton, Lawrenceville & Princeton Company amounting to $200,000 to be reduced to $132,000; the outstanding stock of the Trenton, Lawrenceville & Princeton Extension Company amounting to $50,000 to be increased to $53,000; the $7,000 stock of the Princeton Street Railway to be reduced to $5,000.

In commenting on the project the utility board stated:

> This is a proceeding which has in the past met with the disapproval of this board. Where the securities of underlying companies are wholly owned by another company with which merger is to be effected, the only procedure necessary in such case is to cancel the stock of the underlying companies.

The board also maintained that where mergers are concerned and stocks are transferred, the securities of a company newly formed must bear a proper relation to the value of the property in the newly formed company after consolidation.

$71,194,759 Historical Reproduction Cost

Valuation of the properties of the Pacific Electric Railway, Los Angeles, Cal., is placed at $71,194,759 as representing historical reproduction cost undepreciated by Richard Sachse, chief engineer of the State Railroad Commission in a report made public on Sept. 19. The valuation is of Dec. 31, 1920. Operative property, which is the only part considered in rate making, is placed at $63,412,675 according to the historical reproduction method. The report consists of three large volumes and represents two years work of the engineering department.

The report will be submited in the hearing of the application of the Pacific Electric Railway for increase in rates set before the commission *en banc* for Oct. 11. It does not represent finding of value by the commission, it is pointed out, but will be considered together with such other exhibits as to valuation as may be presented at the hearing.

As is usual in those cases two other sets of valuations are made which, under the rulings of the courts, must be taken into consideration by the commission in arriving at present value. These are the historical reproduction cost less depreciation and cost new less depreciation. Historical reproduction cost less depreciation is placed at $56,372,096, operative property being set down at $50,752,455 and non-operative property at $5,619,641.

Reproduction cost new under a five-year period ended Dec. 31, 1920, of both operative and non-operative property is given at $103,600,000; less depreciation, $82,700,000. The operative property under reproduction cost new undepreciated is $92,400.000.

In addition to the valuation report there will be presented at the hearing by departments of the commission reports touching the financial, operating and traffic conditions of the company.

Receivers Seek Right to Abandon Part of Line

Harry A. Dunn and J. Frank Johnson, receivers for the Toledo & Western Railroad, Toledo, Ohio, has filed an application in federal court for instructions with respect to terminating a franchise for the operation of electric railway lines in Blissfield, Mich.

The action is being taken as the result of a movement to pave Adrian Street in Blissfield. The railway has a franchise to operate lines on Adrian Street and it is contended by the receivers that officials of the city are planning to require the company to pave its tracks and 3 ft. on each side of the tracks.

This improvement would cost $30,000, the petitioners aver, and the company cannot afford to pay it. The receivers declared they had been advised by their attorney that the franchise could be terminated and it is on this matter that a court ruling is sought.

Petition for Indiana Merger Denied

The Public Service Commission of Indiana has denied the petition of the Indiana Electric Corporation for authority to buy seven Indiana public utilities and for authority to issue a total of $12,100,000 of stocks, bonds and notes with which to finance the purchase and to assume a total of $8,962,000 liens against two of the selling companies.

In denying the petition the commission said that it is favorably inclined toward the petitioner's project proposing a centralized power plant in the heart of the Indiana coal field, if such a project could be made to provide low-cost current, but that it is of the opinion that such a project could not be carried out along the lines proposed by the petitioner.

Commissioner George M. Barnard, who had charge of the case for the State, wrote the order. He summarized in the following brief statement the reasons why the commission declined to grant the request:

> The commission is not unmindful of the possible benefits that might accrue to the citizens of the various communities through the establishment of a central generation plant, serving the consolidated properties. Under the law, however, any consolidation of utility properties must have a proper basis of value, a proper relation between value and securities and a sufficient annual income to carry proper capital charges. Permitting the consolidation on the basis proposed would have capitalized excessive values against the consumers. This, of course, is improper. The petition was, therefore, denied.

Valuation Hearing Postponed.—The hearing of the case of the valuation of United Railways, St. Louis, Mo., before the Missouri Public Service Commission, set originally for Sept. 27 at Jefferson City, has been postponed until Oct. 18, at St. Louis. Col. A. T. Perkins, manager for the receiver, and a staff of engineers, attorneys and accountants are completing the company's case to be presented to the commission.

Financial News Notes

Gold Notes Offered.—Stone & Webster, Inc., New York, N. Y., are offering at 96¾ and interest to yield about 8 per cent $750,000 7 per cent gold notes of the El Paso (Tex.) Electric Company. The due date is July 1, 1925.

Can't Suspend Service. — The Ohio State Utilities Commission recently refused the petition of the Ohio Service Company, Coshocton, Ohio, to abandon service at Uhrichsville and Dennison, Ohio. The railway claimed that jitneys were responsible for the loss in revenue suffered by the railway.

Refunding Bonds Offered.—Chandler & Company, Inc., New York, are offering for subscription $560,000 of Lexington (Ky.) Utilities first lien and refunding 6 per cent gold bonds, Series "B." The proceeds of the bonds are to be used to retire underlying bonds, for extensions and improvements and for other corporate purposes.

Income Considerably Reduced—For the seven months ended July, 1921, the Twin City Rapid Transit Company, Minneapolis, Minn., realized a net income of only $372,784 against a net of $643,670 for the same period a year ago. The gross revenues were $8,127,194 against $7,100,242 for the first seven months of 1920.

510,700 Fewer Passengers in Toledo.—The Community Traction Company, Toledo, Ohio, carried 510,700 fewer passengers in August of this year than in July. Street Railway Commissioner Wilfred E. Cann believes that the increased fares in effect since July will make a much better financial showing. He has decided to lay off forty-five platform men to economize on labor.

New Company Elects Officers.—The Savannah Electric & Power Company, Savannah, Ga., organized as the successor under foreclosure to the Savannah Electric Company, has elected officers as follows: President, A. A. Lawrence; vice-president, W. H. Bedgood; secretary, Thomas F. Kearns; treasurer, E. S. Abrahams; directors, A. A. Lawrence, E. S. Abrahams, Louis A. Mills, W. H. Bedgood and Thomas F. Kearns.

May Save Line. — Despite the fact that officials of the Asheville & East Tennessee Railroad, Asheville, N. C., recently announced that service would be suspended on Oct. 1, citizens of Asheville and Weaverville are starting a campaign to raise $5,000 for the continued operation of the line. One plan suggested is that the property owners along the line pay the railway a tax while others are asked to subscribe to stock.

Profit for Shore Line in July.—The Shore Line Electric Railway, Norwich, Conn., was operated at a profit of $7,439 during July, according to a report filed with the clerk of the Superior Court by Receiver Robert W. Perkins. This is the first month in 1921 that has shown a profit. All other months of the year show losses varying from $1,027 in June to $6,112 in February. The losses for the first six months were as follows: January, $3,749; February, $6,112; March, $3,264; April, $2,296; May, $1,411; June, $1,027.

Receiver Seeks Court's Instruction.—Application has been made for an order authorizing Rollo Wells, receiver of United Railways, St. Louis, Mo., to pay semi-annual interest due on Oct. 1 on $9,790,000 St. Louis Transit Company bonds. Interest amounts to $244,750. Application has also been made for extension of time within which to adopt or renounce contracts entered into between St. Louis Transit Company and Missouri Electric Railroad, Florissant Construction Company, Real Estate & Investment Company and Merchants Express Company.

Abandonment Announced in Spokane. Discontinuance of service on the Lidgerwood line and removal of its tracks was announced on Oct. 9 by the Washington Water Power Company, Spokane, in a letter filed with City Clerk Fred Kellam. This step, the company states, is taken as the result of the controversy over paving North Division Street, in which the city tried to force upon the company a large expenditure, chiefly for the benefit of its competitors, the jitneys. The abandonment of the Lidgerwood line is the most important step thus far resulting from the releasing of jitneys by the City Council last June.

Public Service Issues Equipment Trust Certificates.—Plympton, Gardiner & Company, New York, N. Y., and Cassatt & Company, Philadelphia, Pa., are offering, at 100 and accrued interest, to yield 7.25 per cent, $1,540,000 Public Service Railway 7¼ per cent equipment trust certificates, series E. The certificates are dated Aug. 2, 1920, and mature semi-annually until 1930. They are secured on the following equipment: 200 safety cars, 100 trail cars, 15 snow plows and 15 snow sweepers. The cost of this equipment was $2,434,400. The total cash paid was $894,000, or 36 per cent of the cost of the rolling stock.

Interurban Bondholders Organize.—Thomas H. Jones, Williamson Building, Cleveland, Ohio, is secretary of a committee headed by I. F. Freiberger, vice-president of the Cleveland Trust Company, Cleveland, Ohio, which has been requested by the holders of a large amount of the first mortgage 5 per cent gold bonds of the Western Ohio Railway, Lima, Ohio, to act as a committee for the protection of the bondholders. The bonds mature on Nov. 1, 1921, and the railway will not be able to pay them at maturity. A bondholders' protective agreement is in course of preparation under which the Union Trust Company, Cleveland, is designated as depositary. The bondholders are invited to forward their bonds for deposit with the May 1, 1921, and later coupons attached.

Traffic and Transportation

Jitney Problem Solved

Public at Springfield, Mo., Approves Plan of Buses Owned by Electric Railway

Through the persistent efforts of the electric railway management in Springfield, Mo., to provide adequate transportation facilities without the aid of the jitney as a competitor, the bus problem in this city has been solved.

Since 1914 constant effort had been made by the Springfield Traction Company to obtain relief from the unfair and destructive jitney competition, but city officials were reluctant to tackle the proposition. The buses were allowed to run promiscuously and at random at first. Then through an election, they were supposed to be placed under restriction which would confine them to territory not served by the railway. This plan would have produced fairly good results, but the terms of the ordinance adopted at the polls were not observed and as a result the railway was being seriously injured.

The company then endeavored to meet the situation by asking the city for permission to operate jitneys in place of cars on some of its weak lines, the company's buses to enjoy the same liberties as were accorded the privately-owned jitney buses. In this the privately-owned buses seemed to be favored.

As a last resort an initiative election was called in which the people of Springfield were asked to give the railway the exclusive right of operating buses on the streets of Springfield. The election was held on Aug. 2 and the result was a victory for the railway. This phase of the contest is especially of interest for the reason that the jitney bus owners recognized no union and their employees were not organized whereas the railway employees were all members of the railway union and gave their hearty support to the traction company in this election.

Following the election the traction company took over all buses and continued jitney service under the terms of the new ordinance adopted at the election and the plan now seems to be meeting with the general approval of the public.

The ordinance as passed by the people revokes all bus licenses in force prior to the passage of the ordinance and further provides that licenses to operate buses shall be issued only to a corporation duly incorporated under the laws of the State of Missouri relating to street railway companies which at the time of applying must be actually engaged in the operation of a railway system. However, no car lines now being operated shall be discontinued. The fare is 5 cents with regular transfer privileges.

Another important section of the ordinance states that no jitney bus route shall be established or operated in territory now or hereafter adequately served by a street car line, nor shall any jitney bus be required to operate in territory where there is not sufficient patronage reasonably to support it, after a fair trial.

Higher Court Will Decide Fare Issue

City Argues Fare Was Fixed by Contract—Receiver Contends Regulatory Authority Fixes Fare

Decision as to whether the present rates of fare charged by the Receiver of The Denver (Col.) Tramway Company are to be retained or whether the fare shall revert to the 6-cent rate formerly in effect now rests with the United States Circuit Court of Appeals of the Eighth District.

United States District Judge Robert E. Lewis, District of Colorado, on March 10, 1921, held that the 6-cent fare then in effect was confiscatory and isued an order authorizing the receiver to put into effect a fare not in excess of 8 cents cash and two tickets for 15 cents. The city of Denver was also enjoined from enforcing the collection of the 6-cent fare and from interfering with the collection of the higher rates. An appeal from the lower court's ruling in this case was taken by the City of Denver to the United States Circuit Court of Appeals and was argued orally on Sept. 13. John E. Carland, federal judge of Washington, D. C., presided and with him on the bench were Tillman Johnson, federal judge of Utah, and F. A. Youmans, federal judge of Arkansas.

The city of Denver in its brief filed with the higher court asked that the order of the lower court be reversed and that the entire case be dismissed, contending that the lower court had no jurisdiction in issuing the order inasmuch as the fare was fixed by contract and not in pursuance of regulatory authority and that therefore whether or not the 6-cent fare was confiscatory was immaterial and the injunction unwarranted.

The attorneys for the receiver contended that the fare was never fixed by contract but was fixed in the exercise of the regulatory powers of the city and that as a matter of law the city did not have the power or authority to fix a fare by contract but only to fix one by regulation. Furthermore that even conceding for the purpose of precedent that the fare was contractual and that the city had the power so to contract, nevertheless the contract, if ever there was one, was abrogated and superseded by the city when in the exercise of its police power to regulate it passed an initiated ordinance authorizing a 6-cent fare and thereby changed the rate of fare from the franchise rate.

The case was taken under advisement.

One-Man Car Approved

Operation Indorsed by Milwaukee Safety Commission—Municipalities Cited as Users of Cars

The Milwaukee Safety Commission has indorsed one-man safety car operation in the city of Milwaukee by The Milwaukee Electric Railway & Light Company. The report of the committee to this effect was transmitted to the committee on railroads of the Council on Sept. 2. The commission held that the design and special safety equipment of the 800-type cars, as the safety cars are known in Milwaukee, make them safe in operation, and that from a safety standpoint there could be no objection found to their use.

As reported in the ELECTRIC RAILWAY JOURNAL of Aug. 20, page 299, the commission was asked to investigate one-man safety car operation in Milwaukee following the introduction in the Common Council of a resolution calling upon the City Attorney to petition the Wisconsin Railroad Commission to prohibit this form of operation in the city. The investigation made by the commission was for the purpose of determining whether one-man safety cars and the method by which they are operated are safe for passengers, pedestrians and vehicles. The investigation was divided into three phases—the safety appliances of the car itself, the method of operation of the car, and the results of its operation in other cities.

The safety appliances of the safety car were described to the commission at two of its meetings by H. A. Mullett, assistant general manager of the company, and W. H. Beattys, Jr., of the Safety Car Devices Company. The commission, as an official body, also made two investigation trips on the type of car under discussion, during which the control and air brake equipment of the car was demonstrated by an expert operator. Both of these trips were made under regular traffic conditions.

In addition, individual members of the commission on safety rode the cars incognito under regular operating conditions on the Twenty-seventh and Thirty-fifth Street crosstown lines of the company where one-man safety car operation has been in effect for some weeks. As a result of this phase of the investigation the commission was of the opinion that "the standard (*sic*) safety car known in Milwaukee as the '800-type' embodies every feature that has up to the present time been devised and proved practicable to make street car operation safe."

In addition to the descriptions of safety appliances of the car and of its demonstration under actual operating conditions, there was submitted to the commission, on behalf of the company, a memorandum prepared by Alexander Shapiro, statistician, giving a survey of the one-man car operation on electric railways in the United States. The memorandum gave the origin and history, extent of past and present use, its advantages, refuted arguments which are as a rule made in attacking one-man safety car operation, and finally discussed the situation in Milwaukee. Stress was laid in this memorandum on the use of one-man safety cars by various municipal railways in the United States and on the favorable accident record of safety car operation. There was also submitted to the commission by The Safety Car Devices Company, a tabulation giving the accident record of safety cars on a number of electric railways in the United States as compiled by the American Electric Railway Association.

The second phase of the Safety Commission's investigation of safety car operation in Milwaukee concerned itself with the actual method of operation of the car. On this point its report says:

> Safe operation of all vehicles, to a certain extent, is contingent upon the mental alertness of the operator. This commission has been assured by the electric company that no men are chosen for duty on the one-man cars who have not been with the company at least two years, and in addition have passed special tests to measure their fitness for this particular work.
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> As exceptional distractions to the operator of a one-man car should tend to increase the accident hazard, the commission made two requests of the electric company:
>
> 1. That motormen on these cars would not be permitted to collect fares while the cars were in motion. This guarantee has been given and the order is now in effect. It is the observation of the commission that the order is being strictly carried out by the operators of the cars. . . .
>
> 2. The company was asked if it intended to run the "800 type" car with less than two men on heavy traffic lines. Their reply was that most decidedly the cars would not be run with one man on the lines where it is apparent or could be shown that the safety or operation would be in any way inferior to that existing with the present equipment.
>
> With the pledges given by the electric company as outlined above, The Milwaukee Safety Commission believes the one-man standard safety car of the "800 type" to be a vehicle which will not tend to increase traffic accidents, but rather effect a reduction in them, particularly of the numerous so-called boarding and alighting type.

Make-up of Commission

The Milwaukee Safety Commission is an official body appointed by the Mayor. Its membership consists of a number of local business men, representatives of various city departments such as the police, schools, etc., and representatives of various civic organizations. One of the members of the commission is John Anderson, chief engineer of power plants of The Milwaukee Electric Railway & Light Company.

The 800-type car referred to by the Milwaukee Safety Commission in its report is a double truck car seating approximately fifty-five people. It was especially designed for use in Milwaukee and may be operated by two men or one man. It is equipped with the standard Safety Car Devices Company control and air brake equipment for safety cars. It is an especially light, roomy and attractive car and has been very favorably received by the Milwaukee public.

Jitney Battled for Five Years

Seattle Finally Succeeds in Regulating Pirates Who Are Taking $350,000 a Year from Municipal Railway

Seattle has won its fight of five years to clear the jitneys from its streets. The possibility does remain of further appeal of the matter direct to the United States Supreme Court, but the decision by the State Supreme Court on Sept. 13 denying the petition of the jitney men for a review of the case by the higher court would appear to be final. Following the Supreme Court decision, the remittitur or final order vacating the McGlothern injunction, which has hitherto protected the buses of the Sound Transit Company, was forwarded to Major Carl B. Reeves, Superintendent of Public Utilities. He immediately notified the jitney drivers that they were to clear the streets of their cars. The order was compiled within an hour's time, and without demonstration or difficulty of any kind. As a result all jitneys have now been removed from city streets, except the six cars allowed to operate as feeders to the Seattle Municipal Railway.

THE only recourse that the jitney drivers now have is a direct appeal to the Supreme Court of the United States, petitioning for a writ of error. In the event the federal tribunal should grant the request for a review of the case, the bus owners might then apply to the State Supreme Court for a continuation of the McGlothern injunction, but would have to post a bond conditioning payment of the damages resulting to the railway from the operation of the jitneys during this delay.

In opposing the application for a writ of review before the State Supreme Court, Corporation Counsel Walter F. Meier demanded a bond for $300,000, while attorney for the jitneys asked that it be placed at not more than $5,000.

Lower Fares in Sight

Following the removal of jitneys, Chairman C. B. Fitzgerald of the finance committee of the City Council announced that he is working on a proposition to reduce fares on the Municipal Railway from 8⅓ to 6¼ or 5 cents. Mr. Fitzgerald is conferring with state accountants, estimating the cost of operating the railway, and projecting into the future possible savings that may be made. He states that the exact amount of revenues coming to the railways as a result of the ban on jitneys cannot be exactly stated until the receipts have been observed over a period of time, but he expresses the belief that these may be sufficient, with other savings, to make a reduction in fares possible.

Since it acquired the railway lines of the Puget Sound Traction, Light & Power Company on March 31, 1919, the city has been particularly energetic in its efforts to rid the municipal railway of jitney competition, which has bitten deeply into the earnings of the lines. D. W. Henderson, general superintendent of railways, on April 23 of this year, advised Mayor Hugh M. Caldwell that on the basis of jitney checks taken in January of this year, the municipal railways would have an increase of revenue amounting to $350,000, if they could handle all the passengers carried on jitneys for a year, at the 8⅓-cent fare prevailing.

The battle against the jitneys was started, however, on Sept. 21, 1916, when an ordinance regulating jitneys was introduced in the City Council. This ordinance authorized the Superintendent of Public Utilities to issue certificates expiring on the last day of each year, indicating the route, terminals and schedule of operation. Appeal from the decision of the Superintendent of Public Utilities was to the Board of Public Works, with further provision for appeal to the City Council. The rates of fare provided were: adult passengers, 10 cents; children under twelve years of age, 5 cents.

On May 11, 1920, an ordinance (No. 40886) was approved regulating jitneys which provided that applications for permits to operate should be investigated by the Superintendent of Public Utilities, who should submit report to the City Council, which, in turn, could either grant or deny the permit. The permits were to specify route, terminals, schedule and rate of fare and the maximum number of passengers allowed to be carried in the car for which permit was granted. Permits were to expire on the last day of the year in which issued.

Previous Opinion Cited

On June 9, 1920, the United States District Court for the Western District of Washington, Northern Division, in the case of Schoenfeld vs. The City of Seattle (Fed. 265-726) held that the operation of jitney buses on streets could be denied or restricted, on the theory that "the right to use the public streets of a city for the operation of jitney buses thereon as a private business is a matter of privilege, not of right, and can be prohibited by the city, or permitted, under such terms, including the regulation of fares, as the city may prescribe."

On July 6, 1920, there issued out of the Superior Court of King County in the case of H. P. McGlothern vs. The City of Seattle, Restraining Order and Order to Show Cause, which prevented the City of Seattle from enforcing the provisions of Ordinance No. 40886.

On July 6, 1920, the City Council of the City of Seattle adopted the report of its city utilities committee, reading as follows:

> Your committee on city utilities recommends: That all applications now pending be denied, and that the reports of the Superintendent of Public Utilities thereon be placed on file. That the Corporation Coun-

> sel be requested to prepare such ordinance as may be necessary to prohibit interurban buses from doing a local business within the city limits.
>
> The committee, in making the above recommendation that applications for jitney permits now pending be rejected, which applications were to serve sections of the city already supplied with adequate street car service, wishes it understood that bona fide applications for permits to serve districts now without street car facilities for the purpose of enabling the people of such districts to reach the cars of the Municipal Street Railway and be transported to and from their homes for a 10-cent fare, divided 50-50 between the jitneys and the street railway, will be considered by the committee on their merits when received, bearing in mind tentative routes as follows:
>
> From East Sixty-fifth Street and Ravenna Boulevard to connections with Cowen Park and Ravenna cars at Fourteenth Avenue N. E.; also from Fourteenth Avenue N. E. and East Fortieth Street to the Laurelhurst district; also from Beacon Avenue and Spokane Street to Beacon Avenue and Thirty-ninth Avenue S., and also on Beach Drive from Orleans Street to Bruce Street.

ROUTES OUTLINED AND THEN DROPPED

On July 19, 1920, temporary injunction was granted and order signed in the McGlothern case.

On Aug. 14, 1920, the Superintendent of Public Utilities, as a compromise with the jitney interests, submitted to the City Council various jitney routes, the main purpose of which was to keep them away from the street car lines, thus providing service where there seemed to be a public demand. Owing to the fact that the jitney interests could not come to any agreement among themselves as to the routings to be approved, the whole matter of routing was dropped by the City Council.

On Nov. 2, 1920, there was submitted to the electorate of the City of Seattle a measure initiated by the jitney interests, relating to the operation of jitneys which provided, in a mandatory way, for the issuance by the City Comptroller of permits immediately upon applications being filed and showing being made that surety bond required under Chapter 57 of the Laws of 1915, had been filed with the Secretary of State. The application was to specify the route, terminals and schedule. The vote on this initiative proposition was as follows: For, 24,915; against, 41,364.

On Nov. 17, 1920, the Superior Court disposed of the temporary injunction in the McGlothern case by the entry of a judgment denying a permanent injunction. By appeal to the Supreme Court the city was prevented from enforcing this ordinance.

On April 23, 1921, the general superintendent of the municipal railway advised the Mayor of the City of Seattle that on the basis of jitney checks taken on Jan. 26, 1921, if the street railway could handle all of the passengers carried on the jitneys for a year, at the 8⅓-cent fare, the railway would have an increase of revenue amounting to $350,000. The check of Jan. 26, 1921, as compared with the check of Oct. 14, 1920, showed the following:

	Jan. 26, 1921	Oct. 14, 1920
Cars in operation	119	90
Passengers carried	11,065	8,899
Number of trips	1,908	1,633

On April 23, 1921, the general superintendent of railways submitted to the Mayor a summary of jitney checks taken Saturday, April 16, 1921, and Tuesday, April 19, 1921, which showed 2,455 trips and 16,392 passengers carried.

STATE SUPREME COURT UPHELD CITY'S POWER OF REGULATION

On July 20, 1921, the Supreme Court of the State of Washington, in the McGlothern case, concurred in by five of the nine judges of the court, upheld the city's power to regulate jitneys under Ordinance No. 40886. In this case the Corporation Counsel secured an order in the Supreme Court modifying the terms of the temporary injunction so that there was no legal objection to the city's enforcement of the provisions of Ordinance No. 40886 as to all persons except McGlothern and the intervenors in his case.

On July 28, 1921, the Auto Drivers' Union, Local No. 234, the members of which were not covered by the McGlothern injunction, in a communication signed by its secretary, indicated its willingness to accept the routes and regulations agreed upon by the Superintendent of Public Utilities.

On Aug. 2, 1921, approximately 160 of the 220 jitneys operating in Seattle were advised by the city that they would not be allowed to operate after that date.

On Aug. 3, 1921, eighteen jitney drivers were arrested for operating without a permit and upon trial were fined $25 each.

On Aug. 3, 1921, the attorney representing the jitneys which had been excluded from the public highways, appeared before the Supreme Court of the State of Washington and endeavored to secure an order allowing them to intervene in the McGlothern case, but their petition as granted was construed by the Corporation Counsel only to allow them to intervene as "friends of the court" and not to grant intervenor's rights.

On Aug. 19, 1921, application for rehearing by the Supreme Court was filed by the plaintiffs in the McGlothern case. The result of the filing of this petition was to keep the temporary injunction in effect.

COMPLAINT MADE AGAINST NON-UNION BUSES

On Aug. 26, 1921, the secretary of the Central Labor Council of the City of Seattle, in a communication to the Mayor, City Councilmen, Superintendent of Public Utilities, Corporation Counsel for the City of Seattle and Prosecuting Attorney for King County, complained that "the union jitney buses were put off the streets while the non-union buses continued to operate unmolested."

The communication further advised:

> We feel that a great injustice is being done our members through this action and desire to request that you use your best offices to the end that a square deal may be given the union boys by allowing them to operate until such time as you are in a position to make the order prohibiting them from using the streets to apply to all alike, whether union or non-union.

Chicago Fare Case to Start on Oct. 3

Taking of evidence in the fare case against the Chicago Surface Lines will begin on Oct 3. Announcement to this effect was made by the Illinois Commerce Commission on Sept. 16 at the conclusion of arguments lasting three days. The companies, through Attorney Harry P. Weber, had contended that the commission had no right to disturb the present situation on petition of the city because of the pendency of appeals brought by the city against the existing fare order. Chairman Smith stated that the commission was not bound by strict rules of pleading observed in the courts. He said the essential issue is the reasonableness of rates of fare charged by the companies and it is the duty of the commission to determine this as soon as possible.

It is likely that the hearings before the new commission will be extensive. The former commission spent more than a year on the case which resulted in the fixing of an 8-cent fare on July 1, 1920, and a valuation last November. The new state and city administrations are pledged to give a 5-cent fare if possible and it has been claimed that this can be done by the institution of economies. The companies have shown by figures that a reduction of even 1 cent in the rate of fare would have to be accompanied by a large wage decrease and that a 6-cent or 5-cent fare is impossible.

Hearings on the question of reducing fares on the Chicago Elevated Railroads were started before the Illinois Commerce Commission on Sept. 27. The company was cited to appear before the commission. This was said to be a surprise to the city authorities who had been centering their attack on the Chicago Surface Lines. The elevated lines have had a 10-cent fare with four tickets for 35 cents since last August. According to President Britton I. Budd this is not an excessive charge and he recently gave out some figures that the company was earning only 3 per cent on the valuation of $86,250,000 fixed by the former commission.

The statement of President Budd showed that the earnings after operating charges were $2,590,804 for the year ended June 30. After taking out interest charges there remained only $102,016, compared with $97,817 for the previous year.

City Must Respect the Law

Supreme Court Justice Cropsey in Brooklyn has granted an injunction restraining George Cornell from operating a bus line to Far Rockaway from Rockaway, in competition with the Ocean Electric Railway. The court held the bus line is being operated without a proper franchise. Justice Cropsey said:

> There is no emergency shown here. It may be that more transit facilities are needed in the section in question, but if so the city should act in accordance with the law and have the service improved. The city cannot and should not proceed in an illegal manner.

Jersey Appeal Concluded

Argument Finished to Permit Railway to Charge Ten Cents Despite Commission Ruling

Decision has been reserved by Federal Judges Rellstab and Davis of the Trenton District and Federal Judge Victor Wooley of Delaware on the application of the Public Service Railway, Newark, N. J., to enjoin the Board of Public Utility Commissioners of New Jersey from interfering with the establishment by the company of a 10-cent fare. Argument was concluded at Trenton on Sept. 26, the case having been reopened to give interested municipalities a day in court as co-defendants.

CITIES ALLOWED TO INTERVENE

Argument in behalf of the municipalities generally was made by George L. Record and Frank H. Sommer. Mr. Record contended that the purpose of the company in the present proceedings is to establish, through the granting of a temporary injunction, a rate based upon the high prices and cost of operation prevailing during the war and the immediate post-war period. Final determination of the proceedings, he predicted, would consume three or four years, and in the meantime, if the company's application prevailed, the public will be compelled to pay exorbitant rates or will be forced to assume the burden of proof in a litigation to force a modification of rates.

E. G. C. Bleakley, as counsel for Camden, made the point that the practical effect of a 10-cent fare will be to decrease rather than to increase the gross receipts and that Camden, as well as other municipalities which tax the company on the basis of receipts, will be a consequent loser. Conceding for the purpose of argument that the company needs additional revenue, Mr. Bleakley said it is for the court to determine whether a 10-cent fare will accomplish that result. Another point urged by Mr. Bleakley was that any rate fixed should not be limited solely to cash fares, but that strip tickets should be issued at reduced rates. The practical effect of this, he said, would be to increase the number of riders and to lessen the delay of collecting fares, especially during rush hours.

At the hearing before the court on Sept. 15 argument by L. Edward Herrmann, counsel for the Public Service Commission, was concluded. He insisted, in short, that due consideration had been given by the commission to all the questions involved in the valuation. Mr. Herrmann sought to have admitted as evidence more than 13,000 pages of testimony taken by the board in the rate case and about 600 exhibits, but the court ruled that only such parts of this record as were pertinent would be admitted.

The methods used by Colonel Black in the so-called Ford, Bacon & Davis appraisal were attacked by the counsel for the commission, but Judge Wooley said that to his mind it did not make any difference how the board arrived at a valuation. If the valuation was right, it was right and the plaintiff was out of court. If it was wrong, there might be confiscation of property. That was the real question to be settled in the federal court. The issue turned between the valuation of the board and that of the company. Judge Wooley indicated that the desire of the court was to have the utility commission answer in detail the charges of the company.

Mr. Herrmann cited the opinion of Justice Hughes in the Minnesota rate case where it was held that valuation in abnormal times must be a matter of judgment and reason coupled with the cost to reproduce the property. He regarded it as unreasonable that the railway, which never paid a dividend in excess of 3 per cent, should now be seeking a return of 7 per cent.

Attorney-General McCran argued for the State. He contended that the court could not fix a rate, but that the state could. The court could only consider the question whether or not the utility commission had fixed a rate which was confiscatory. Mr. McCran insisted that there had been a return of 7 per cent to the company on stock if proper allowance were made for the rentals paid to the subsidiary companies. In short, he insisted that unless the court decided the members of the commission were incompetent, the court must accept their finding as competent and just.

COMPANY MUST HAVE RELIEF

Richard V. Lindabury concluded the argument for the company and closed the case. He said that the situation was such that unless the court granted relief the company must lose its properties, with great loss to stock and bondholders and inconvenience to riders. He declared it was a matter of mathematics. Prices of all things were more than double while the fare was but a little more. In detail he showed that the increase in the price of labor ordered by the War Labor Board resulted in doubling the wages the company was obliged to pay. He told of all materials increasing in price 200 to 300 per cent and went into the merits of all applications of the company to get "a just and equitable rate" from the utility board, and ended by declaring that the utility board had not risen to the full heights of its duty to protect the company. He defended the action of the company in appealing to the federal court to prevent the confiscation of the property by the rate fixed by the utility board.

The commission recently allowed the company an increase of from 1 to 2 cents on its transfers, but refused to allow more than a 7-cent fare. Instead of taking this ruling to the state courts, the company sought a preliminary injunction in the federal court, claiming the order violated the federal constitution in that it was confiscatory and if allowed to stand the company would be forced into bankruptcy.

Transportation News Notes

Fare Boxes Pay Big.—Fare boxes recently installed on cars of the Community Traction Company, Toledo, Ohio, cost $90,000 for the equipment and installation. They have paid for themselves twice over in three months, declares Street Railway Commissioner Wilfred E. Cann.

Tokens Will Replace Tickets—Metal tokens will replace paper tickets on the lines of the East St. Louis & Suburban Railway, East St. Louis, Ill., according to a recent announcement of W. H. Sawyer, president of the company. The tokens can be purchased at the rate of two for 15 cents, the cash fare remaining at 8 cents.

Uniform Stage Rate Authorized—On Sept. 7 the United States Stage Line, operating between Los Angeles and Imperial Valley points, was authorized by the California State Railroad Commission to place its rates on a uniform basis of 3½ cents a mile. This will result in sixty-three reductions and 21 increases in the stage company's rate schedule according to the announcement of the commission.

All One-Man Cars in St. Thomas.—The St. Thomas (Ont.) Municipal Street Railway has converted all cars for one-man operation. It is claimed that the change has resulted in improved service and financial advantage. Acting under recent provincial legislation the city started a Sunday service this year, but the railway committee has advised Council to discontinue Sunday operation as it is a losing venture.

Louisville Hearing in November—The City of Louisville, under the direction of City Attorney Joseph F. Lawton and his assistant, is busy preparing the city's side of the argument in the suit which is pending against the Louisville Railway, the city disputing the right of the defendant to charge a 7-cent fare, the collection of which was authorized by decision of Judge Evans of the Federal District Court. The case was carried to the United States Supreme Court and it is expected that a hearing will be set for some time in November.

Jitney Ordinance Upheld. — Judge Dew in the Circuit Court at Kansas City, Mo., on Sept. 17 upheld the city ordinance that requires jitney operators to secure the signatures of 51 per cent of property owners on street over which they operate. The court denied a restraining order that would have prevented the city from interfering with jitney operators under the ordinance and declared the city has full control over streets. Mayor Cowgill followed the ruling with an order to arrest all jitney men violating the ordinance, including those taking "gifts" for rides in cars labeled, "this ride is free."

Personal Mention

Mr. Brown Back in Buffalo

After Four Years in New Orleans He Becomes General Manager of Two Separate Properties

Nelson H. Brown has been appointed general manager of the Buffalo & Lackawanna Traction Company and also general manager of the Depew & Lancaster Railway Corporation, Buffalo, N. Y. These two companies are separate and distinct properties, the Buffalo & Lackawanna Traction Company being in charge of Harry Evers, while the Depew & Lancaster Railway is owned by local interests and has as its president John J. Lenahan, Buffalo, N. Y.

Prior to being identified with these two companies, Mr. Brown was for four years manager of the New Orleans Railway & Light Company, New Orleans, La., and before going there was for five years general superintendent of the International Railway, Buffalo, N. Y. In all, he has spent twenty-seven consecutive years in street railway work.

N. H. BROWN

Mr. Brown is a native of Tennessee, where he remained until the age of eighteen, when he accepted a position with the New York Central Railroad in the mechanical department at Syracuse, N. Y., in 1891. He continued with the New York Central until 1894 when he entered the street railway field with the Syracuse Rapid Transit Railway as a conductor and motorman. He was subsequently promoted to the positions of station clerk, station foreman and supervisor, when in February, 1907, he resigned to become identified with the Worcester (Mass.) Consolidated Street Railway as general inspector for the purpose of making an investigation of the property.

In September of the same year Mr. Brown was made superintendent of the Worcester & South Bridge Street Railway, which controls several small companies radiating from Worcester. He held this position until September, 1912, when he resigned to accept the position of superintendent, claim agent and roadmaster of the Albany Southern Railway with headquarters at Rensselaer, N. Y.

Mr. Brown remained with the Albany Southern Railway until Jan. 1, 1913, when he was induced to accept a position as assistant superintendent of transportation of the International Railway, Buffalo, N. Y., on account of the broader field of opportunities which the position with that company opened to him. On Jan. 1 of the same year he was promoted to the position of superintendent of the Buffalo division and in November, 1915, was made general superintendent of the company. The International Railway operates all of the street railway lines in the cities of Buffalo, Niagara Falls and Lockport, including many interconnecting interurban lines. In 1917 Mr. Brown was transferred from this position to that of manager of the electric railway properties of the New Orleans Railway & Light Company, both of which are subsidiaries of the United Gas & Electric Corporation.

United Electric Official Resigns

Requesting that he be relieved of his duties not later than Oct. 1, Zenas W. Bliss, one of the state's representatives on the board of directors of the United Electric Railways, Providence, R. I., has resigned as president of the corporation. His resignation was received by the directors at their last meeting, but was then laid on the table for action at some future time.

Bank Commissioner George H. Newhall, the other representative of the state on the company's board of directors, was elected secretary and treasurer of the corporation when the temporary officers were chosen. Although he has not yet resigned from those posts, it was said that such action on his part would not come as a surprise.

Mr. Bliss was elected president of the company when the temporary officers were chosen and gives as the reason for his resignation at this time the fact that the affairs of the new organization are now in shape for the election of a permanent president. His letter to the directors is as follows:

> As one of the incorporators of United Electric Railways, chartered in 1919, I assisted in the steps taken preliminary to organization under the charter, and was made temporary president upon organization. Later permanent directors were chosen by the stockholders. I was appointed a director by the Governor under the charter provisions, and was retained as temporary president. Authorization for the issue of securities was duly obtained, the properties of the traction system were acquired, and subsequently the properties owned by the Rhode Island Company were purchased.
>
> As all things necessary to be done in connection with the organization and the transfer of the properties acquired have been accomplished, and the properties are now being operated by the company, it is apparent that the time has come for the election of a permanent president; and I. therefore, hereby tender my resignation of the office of president, to take effect at the pleasure of the board, but not later than Oct. 1, 1921.

Mr. Buchanan Resigns

Will Leave Richmond to Develop and Expand the Trackless Transportation Field

C. B. Buchanan resigned on Sept. 27 as vice-president and general manager in charge of operation of the Virginia Railway & Power Company, Richmond, Va. His resignation was accepted by the board of directors effective Oct. 1. He has been connected with the Virginia Railway & Power Company since its reorganization in 1909 and is known as an expert in railway transportation and operation.

Mr. Buchanan designed and drew the specifications for the Atlas-General Electric trolley bus which was recently given a demonstration in Richmond and Norfolk and which the Virginia Railway & Power Company expects to introduce there shortly as a commercial venture. He will go into business on his own account, opening an office in New York City for the development of the trackless trolley through the installation of trollibus lines and sales of cars.

C. B. BUCHANAN

Mr. Buchanan expressed the view recently that the trackless trolley was the coming thing in the electric transportation field and said he expected to handle the development of the trollibus throughout the country.

The board of directors of the Virginia Railway & Power Company abolished the office of vice-president in charge of operation, devolving the general duties of that office on the office of President Thomas S. Wheelwright. The office of general manager is divided. John E. Harvell was appointed general manager of the Richmond and Petersburg lines and T. Norman Jones, general manager of the Norfolk and Portsmouth lines.

Mr. Buchanan entered the electric railway field as treasurer and auditor of the Memphis & Raleigh Springs Railroad, Memphis, Tenn., in 1891. After the sale and consolidation of the city and suburban railways in Memphis two years later, he took up the construction and operation of railways and lighting plants throughout the State of Mississippi and later managed the railway and lighting plant at Meridian, Miss.

Leaving there in 1901, Mr. Buchanan accepted positions as division superintendent of the Richmond Passenger & Power Company and general agent of the Richmond & Petersburg Electric Railway. Subsequently he served the several consolidated companies in Richmond as superintendent of transportation.

MADE HEAD OF RAILWAY PROPERTIES

With the reorganization of the railway and lighting properties in Richmond, Manchester and Petersburg by the Virginia Railway & Power Company in July, 1909, the title of general manager was abolished and Mr. Buchanan was appointed operator of railways with the title of general superintendent of railways. In July, 1911, when the railway, lighting and gas properties of the Norfolk & Portsmouth Traction Company, operating in Norfolk, Portsmouth and Suffolk, were purchased by the Virginia Railway & Power Company, Mr. Buchanan was appointed general manager of the combined properties.

Harry C. Stevenson, assistant to the president, Public Service Railway, Newark, N. J., returned recently from Belmar where he has been recuperating all summer from an operation. His associates have missed him a great deal and are glad to have him back.

S. B. Irelan was recently appointed receiver and general manager of the Montgomery Light & Traction Company, Mantgomery, Ala., to succeed Ray Rushton, resigned. Until this appointment Mr. Irelan was vice-president and general manager of the Montgomery Light & Water Power Company to which office he was elected in 1917.

Elmer P. Haw, who occupies the position of superintendent of the street railway lines of the Panama Electric Company, Panama, is now in the United States visiting his brother in Davenport, Iowa. Mr. Haw is visiting in the states far the first time in ten years as he has lived in Central America since early manhood. He is by profession a civil engineer and has managed the street car lines of Panama City for the past 10 years. Twenty-five cars are operated in Panama City over 15 miles of track. Mr. Haw states that the citizens of Panama City are now considering the introducing of one-man cars. While in Davenport Mr. Haw intends to inspect the street car system there for suggestions in improving the line he superintends in Panama City.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Railway Equipment at a Level, Says W. H. Heulings, Jr.

Prices for electric railway equipment reached their peak in October, 1920, says W. H. Heulings, Jr., vice-president and general manager of sales of the J. G. Brill Company, writing in the September issue of *Aera.*

After October, 1920, there was a decided drop, he says, which by Jan. 1, 1921, was twenty-five per cent under the high peak. This was followed by an additional sixteen per cent by April 1.

Mr. Heulings believes a reduction in cost of labor and raw materials brought about this condition. He thinks prices for rolling stock, which have not varied for three or four months, will long continue at the present level.

Price adjustment, he says, will be gradual and take a long time. He believes some business can be done more advantageously now, as the return that new equipment will earn will be in excess of any reductions in initial cost that can be expected in the near future.

Price of Conduit Reduced Nearly 7 per Cent

Rigid iron conduit reacted to a further price drop on Sept. 16. Card 48 was issued as of that date, placing discounts four points higher. In carload lots ½-in. black now takes 45 per cent and ½-in. white takes 39 per cent discount. These figures are the same as those issued under date of Feb. 15, 1917, showing pipe to be back to where it was four and one-half years ago. Meanwhile the discounts have been reduced to a low figure of 21 per cent—a record high price in May, 1917, since which time they have tended upward to the present figure.

Department of Commerce to Publish Statistics on Wire

Representatives of thirty-four bare and insulated copper-wire manufacturers met at the Hotel Commodore, New York, on Sept. 13 to discuss the advisability of asking the Department of Commerce to include wire production statistics in its "Monthly Survey of Current Business." About two-thirds of those present voted to furnish the necessary figures, three objected, and the rest preferred to defer decision until they had had more time to consider the matter. There was every assurance at the meeting that, provided the Department of Commerce would collect, tabulate and print such wire statistics, at least 60 per cent of the copper-wire producers of the country would be represented at the outset.

W. M. Steuart, director of the Department of Commerce, who is director of the survey, was present and described the department's plan and method of working. Statistics are furnished at the department's request. These are tabulated and printed monthly, and individual reports are kept entirely confidential. The definite form of report which the manufacturers will recommend to the Department of Commerce is now under consideration by a committee.

Brazilian Market for Railway Equipment

Since 1914 new railway construction in Brazil has been limited and only restricted quantities of rolling stock purchased, with the result that the present mileage and somewhat deteriorated equipment are entirely inadequate for the growing needs of the country, according to the Bureau of Foreign and Domestic Commerce. A crisis has developed in the Rio Grande railway system where the farms of the interior have produced more than the carrying capacity of the railways. Similar troubles are experienced in other districts. More or less additional equipment is needed for all the lines, of which there is a total of 17,477 miles.

Both the Government and private railways are unable to purchase the rolling stock or make the extensions so urgently needed, although some new purchases are under consideration and a small amount of new construction in progress. This inability is due to reduced receipts, resulting from reduced foreign trade, and the fact that public sentiment opposes any increase in the rates, and the reduced value of the currency as compared with the pound or dollar.

Although the present market for rolling stock is obviously far below the actual needs of the country, it is still important. Approximately 50 steam and electric locomotives have recently been shipped from factories in the United States or are in course of construction here. Further electrification and more business are expected.

The market for rolling stock is at present largely limited to the Rio Grande system (government owned); the three lines of the State of Sao Paulo, viz., the Paulista, the Mogyana, and the Sorocabana; the Central of Brazil (government owned); and the Inspectoria Federal das Obras Contra as Seccas. The last-mentioned is the administrative bureau in charge of the reclamation projects being carried out in Ceare and the adjoining states. The Noroeste, the Oeste de Minas, the Viacao Bahiana, and the Ferrocarril de Goyaz have all had certain sums placed at their disposal from the Federal budget for the purchase of limited quantities of materials. Other business would develop rapidly if the financial and legal obstacles could be overcome.

The United States has long held an unusually strong position in the Brazilian market for rolling stock, due largely to the pioneering of some of our manufacturers of such equipment. Of the importations of rolling stock practically all during the years 1917 and 1918 was shipped from the United States.

Chilean Contract Awarded

Westinghouse Company Closes $7,000,000 Deal for Electrification of Chilean State Railway

Westinghouse Electric International Company has announced that it has received final confirmation of the contract to supply the equipment for electrifying the Chilean State Railway between Valparaiso and Santiago and to Los Andes.

The contract received from the Chilean Government through the company's Chilean agents, Errazuriz, Simpson & Company, associated with Spruille Braden, New York, covers the most important railway electrification since the beginning of the war and the largest ever undertaken by an American firm outside of the United States. The main line, which is 116 miles long and is now under steam operation, is the most important in Chile. It connects the leading seaport, Valparaiso, with the capital, while the line to Los Andes is 28 miles long and forms the Chilean end of the transcontinental line to Buenos Aires.

The contract, which has a total value of $7,000,000, was secured in spite of keen competition from German and other European concerns. The award was given to the American firm because of its more complete and accurate engineering analysis of the proposition as well as its lower price.

The equipment to be furnished consists of eleven passenger locomotives, fifteen road freight locomotives and seven switching locomotives, together with five 4,000-kw. substations. The 3,000-volt direct current system will be used and all standards will be strictly American in character. Capacity of this equipment will be 50 per cent greater than the present traffic demands, and the plans have been so drawn that an increase of traffic capacity to three times the present amount can be readily accommodated. Owing to the abundance of water power in Chile and the high price of fuel, all of the Chilean railways will eventually be electrified and the present project is the first step in this process.

This contract represents the third large order for electric railway supplies received by Westinghouse International Company from foreign countries in the past few months. The other two came from France and Japan. Errazuriz, Simpson & Company will build the overhead trolley construction.

Rolling Stock

Gadsden, Bellevue & Lookout Mountain Railway, Gadsden, Ala., expects to purchase in the near future two one-man cars.

Delta Light & Traction Company, Greenville, Miss., recently purchased from the American Car Company, St. Louis, Mo., two Birney safety cars.

Eastern Pennsylvania Railways, Pottsville, Pa., recently purchased a Russell 30-ft. combination car with B-6 trucks and with two steel single-track snow-plow noses.

Hutchinson (Kan.) Interurban Railway is at present in the market for sufficient car seats for five cars which are being overhauled and re-equipped.

Hull (Que.) Electric Company, according to G. Gordon Gale, vice-president and general manager, has recently placed an order with the Ottawa Car Manufacturing Company for 2 one-man safety car bodies.

Evansville, Suburban & Newburgh Railway, Evansville, Ind., is now in the market for from 15 to 25 used 80,000-lb. capacity flat-bottom gondola cars, according to information received from Gus Muhlhausen, president and general manager of the company.

Track and Roadway

Illinois Central Electric Railway, Canton, Ill., expects to build a switch to the Buckheart Coal Company in Fulton County, Ill.

Toronto (Ont.) Can., The Transportation Commission has bought land for a car line loop at the Bloor and Jane Streets Terminus.

Trenton & Mercer County Traction Corporation, Trenton, N. J., has been granted permission by the Trenton City Commission to lay double tracks on Pennington Avenue, from North Warren to Willow Streets.

Eastern Massachusetts Street Railway, Boston, Mass., has started on an improvement in Central Street, Lowell. The work consists of the removal of old rails between Market Street and Towers Corner and the laying of new ones. The work will cost about $10,000 and will take about two months to complete.

Dallas-Terrell (Tex.) Interurban Railway, which is to be built by Strickland interests, may be extended from Terrell to Tyler. This extension, which would be nearly 100 miles long and would traverse a rich agricultural section of Texas, is being sought by residents of Canton and other cities and towns along the line of the proposed extension.

Pacific Electric Railway, Los Angeles, Cal., has been ordered to do repair work on the East Orange Grove and East Washington Street lines in Pasadena. On the East Orange Grove line the railway will repair its right-of-way between Hill Avenue and the east end of the line. On the East Washington Street line the work to be done will be between Los Robles Avenue and the east city limits.

Columbus (Ga.) Railroad has completed its paving along Hamilton Avenue. New rails and ties have also been put down. Work of paving between the tracks from Seventeenth to Thirtieth Street has also been completed, keeping pace with the work of paving done by the city on Second Avenue. It was stated recently that the city may extend its paving on Second Avenue from Thirtieth Street to Thirty-first Street, in which event the company would also pave along its tracks this additional distance—about 1,000 ft.

Power Houses, Shops and Buildings

Toronto (Ont.) Can., The Transportation Commission will build an automatic substation on Eglinton Avenue, North Toronto.

Gadsden, Bellevue & Lookout Mountain Railway, Gadsden, Ala., expects to build a 100 room club-hotel as a feeder for its line.

Kansas City, Lawrence & Topeka Electric Railroad, Kansas City, Mo., contemplates purchasing one 300-kw., 60-cycle rotary converter.

Public Service Railway, Camden, N. J., will abandon the present freight room at the Riverside carhouse and the storeroom of the electric company, which has a large platform, is to be utilized for a freight house. Also, the freight terminal at Public Service Junction will be abandoned and store house of the gas company at 347 Warren Street will be used. This location will be an advantage on account of having platform facilities and being nearly at the center of the city.

Trade Notes

Ernest E. Lee Company, 115 South Dearborn Street, Chicago, has recently become the district representative for the Northern Equipment Company, Erie, Penn., manufacturers of boiler feed regulators and pump governors.

F. V. Shannon, vice-president and secretary of the Massey Concrete Products Corporation, Peoples Gas Building, Chicago, has resigned to accept another position. G. H. Redding has been elected secretary of this and affiliated companies, the position of vice-president remaining vacant for the present. David A. Hultgren has been appointed resident manager at Chicago.

Triumph Electric Company, Cincinnati, Ohio, for nearly thirty years manufacturers of 40-deg. Triumph polyphase induction and direct-current motors, has again been forced to move its Philadelphia office into more spacious quarters to adequately take care of the increasing demand of its business in that section. The new quarters are at 709 Arch Street. This territory is under the direction of District Manager Arthur H. Allen.

R. I. Baird, from 1909 to 1917 connected with the sales department of the Electric Storage Battery Company, Philadelphia, Pa., has returned to the service of that company. He is now in charge in the western district of the sales of Exide batteries for railway car lighting, etc. Mr. Baird's headquarters will be at the Chicago office of the company. The railway signal work is in charge of H. B. Crantford, who was formerly in the service of the Chicago, Milwaukee & St. Paul Railroad.

The Morton Company, which will supply sales counsel in advertising and merchandising, has been organized in Cleveland with headquarters at the Finance Building, 750 Prospect Street, Cleveland. C. O. Morton is managing director and A. B. Cole, long with the publication department of the Westinghouse Electric & Manufacturing Company, is president. Mr. Cole made a special study, a few years ago, of electric railway freight transportation and contributed a series of articles on this topic in the ELECTRIC RAILWAY JOURNAL. Other officers of the company are Geo. W. Randall, secretary; Roy M. Brown, vice-president; R. S. Andrews, vice-president, and F. E. Crawford, treasurer.

New Advertising Literature

Spot Welder.—A new bench-type spot welder, the S-4-B, has been placed on the market by the Taylor Welder Company, Warren, Ohio.

Pyrometer.—The Brown Instrument Company, Philadelphia, has just made improvements in the automatic compensating features of its "Thermo-Electric" pyrometers.

Control Switch.—The South Bend Current Controller Company, South Bend, Ind., announces its new R-C-O-C remote-control switch for station control of outdoor lighting and other loads.

Fittings.—The Erie Electrical Equipment Company, Inc., Johnstown, Pa., has issued discount sheets dated July 15 and two new catalog sheets on split porcelain insulators and pipe-frame fittings and caps.

Air Brakes.—The Air Brake Association has just added to its list of educational air brake books one of the new Westinghouse U.C. equipment under the title of "Questions and Answers on the U.C. Equipment." The book is particularly intended for those men engaged in railroad service who desire to inform themselves to a varying degree on the construction, operation and function of the new U.C. passenger air brake equipment. A ready comprehension of the general principles is possible without any previous knowledge of certain details.

PEACOCK ADVISES

"Don't Blame the Other Fellow"

Passing the buck when something goes wrong is a familiar weakness of human nature. The motorman may blame the shopman for a bad brake or he may blame the brake itself, while the shopman may be inclined to cast aspersions on the motorman's ability, or to find fault with the management for using unsatisfactory equipment.

PEACOCK BRAKES

avoid occasions for finding fault

Mutual confidence and harmony between the men on the road and the men in the shop—as well as between both these departments and the management—can be had only when the equipment used is free from physical defects, and from technical errors or weaknesses in design.

The reason why Peacock Brakes are so thoroughly popular with the rank and file, as well as with officials wherever they are used, is because they are so absolutely dependable.

Peacock Brakes are designed to get the maximum braking power with minimum effort and in the quickest possible time. They are rugged and durable with strength where strength is needed. Just as their great and dependable braking power is the delight of the motorman, their simplicity of construction and ease of maintenance is the satisfaction of the mechanical department.

The 12/52 Peacock Improved Brake

is the one to use for heavy traction cars, whether for regular service or as an emergency brake in connection with the usual service air brake.

Specify Peacock Brakes for both new and rebuilt cars!

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890 Ellicott Square
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Bankers and Engineers

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Detailed Examinations by Experts
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Specializing in Utility Rate Cases and Reports to Bankers and Investors
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FARES, BUSES, MOTOR TRUCKS
More revenue from *more* riders
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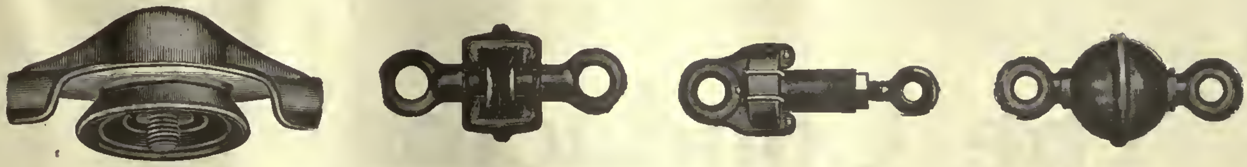


You Can Minimize Overhead Repair Work

and successfully cut maintenance costs if you turn to

The Macallen Line

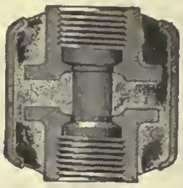
of strain insulators, hangers, splicing ears, crossings, and other overhead material.

They are "specialty" products, designed and built to make "Macallen" the standard on American railways.

It will pay you to write for information and prices.

The Macallen Insulating Joint

Adopted by principal air brake manufacturers as part of their standard equipment. Also insulates steam pipes, etc. Shell is seamless drawn steel, nipples are machined from steel rod, and insulating material is Macallen Vulcanite Compound, not affected by heat or oil—practically indestructible.



May We Send Our Catalog?

TRADE MACALLEN MARK

The Macallen Company

Macallen and Foundry Sts., Boston

TRADE MACALLEN MARK

The Most Successful Men in the Electric Railway Industry read the

ELECTRIC RAILWAY JOURNAL

Every Week

THE COAL & IRON NATIONAL BANK
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Capital $1,500,000
Surplus $1,000,000 Und. Profits $363,051
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Offers to dealers every facility of a New York Clearing House Bank.

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Engineers—Constructors—Maintenance
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DAY & ZIMMERMANN, INC.
ENGINEERS
Design, Construction
Reports, Valuations, Management
NEW YORK PHILADELPHIA CHICAGO

THE P. EDWARD WISH SERVICE
50 Church St. NEW YORK
DETECTIVES
Street Railway Inspection
131 State St. BOSTON

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

E. W. CLARK & CO. MANAGEMENT CORPORATION
Engineers
Unit Power Plants insure low power costs
Huntington Bank Bldg., Columbus, Ohio

The Conductor and His Job

Your conductors are in a position to gain and keep the good will of the public and to build up business for you. Give them a chance.

The Ohmer System of fare collecting and fare accounting places the conductor in the position of a responsible sales man of transportation and he soon learns that the better he serves your interests the better he serves himself.

The Ohmer System gives him means for indicating and recording each transaction as it takes place. This is good business. Every successful merchant knows it is the best way to handle sales.

The Ohmer System points out to the management the characteristic tendencies of each conductor and indicates the sort of discipline which will do the most good. The Ohmer System stands for the best of modern business methods applied to city and interurban electric railroading.

Ohmer Fare Register Company
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"P & H" Guaranteed Penetration Process Poles Stand Your Own Test

The *metal disc* countersunk on the butt-end of every pole is your assurance of the guaranteed half inch uniform penetration.

The *written guarantee* issued with every shipment of poles is your assurance of money back on every pole that fails to show the guaranteed half inch depth of preservative.

Your own test of these poles is your means of assurance of a 100 per cent job of Butt-Treatment.

Accept no substitute process
Insist upon the "P & H" Guaranteed

WE produce and sell treated and untreated Northern White and Western Red Cedar Poles;—we can give you any form of Butt-Treatment;—and we are the originators of the Guaranteed Penetration Process—the "P & H."

Our Pamphlet "Butt-Treating Cedar Poles at the Page & Hill Plant" will tell you all about it.

PAGE AND HILL CO.

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"TIGER" BRONZE

"TIGER" BRONZE AXLE AND ARMATURE BEARINGS

It will pay you to investigate the money saving characteristics of "Tiger" Bronze Bearings and to learn more about the Engineering Service that goes with them. Write today for details—without obligation.

A penny saved is *not always* a penny earned

Try to convince an experienced buyer of Electric Railway equipment that the good old proverb "A penny saved is a penny earned" always holds good and you'll have an argument on your hands.

He'll tell you that a penny saved is *not always* a penny earned—that very often it means *a dollar lost.*

Men who have bought axle and armature bearings on the penny saving basis have learned to their sorrow that cheap bearings are poor economy—false economy. They have learned that *service* is the real test of a bearing—service that guarantees slow and even wear—correct bearing alignment—greater mileage—decreased wear on axles and journals.

That's why the *most careful* buyers—the *most economical* buyers—the buyers who save the *real* money on equipment, invariably choose More-Jones "Tiger" Bronze Axle and Armature Bearings. They have learned from experience that in the long run they are by far the most economical.

More-Jones Brass & Metal Co.
St. Louis, Missouri

TROLLEY WHEELS:
V-K Oilless, M.J. Lubricated
HARPS: *V-K Non-Arcing*
BEARINGS: *"Tiger"*
Bronze
Axle and Armature
ARMATURE BABBITT
and Similar Products

MORE-JONES

Nuttall Standard Helical Gears

A Proven Success

Rounded Teeth form a ready means of identification and eliminate sharp corners.

Proved by Service

Nuttall Standard Helical Gearing, manufactured since 1914—in a constantly increasing volume—demonstrating superiority every day in every class of service due to the 7-½ angle, long and short addendum type of tooth, workmanship and BP Treatment.

Over 25,000 sets in service ranging from the 8 ton Safety Car to the 300 ton Electric Locomotive.

R.D.NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

All Westinghouse Electric and Mfg. Co. District Offices are Sales Representatives in the United States for Nuttall Electric Railway and Mine Haulage Products.

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Steel Tires

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- Registered Mail
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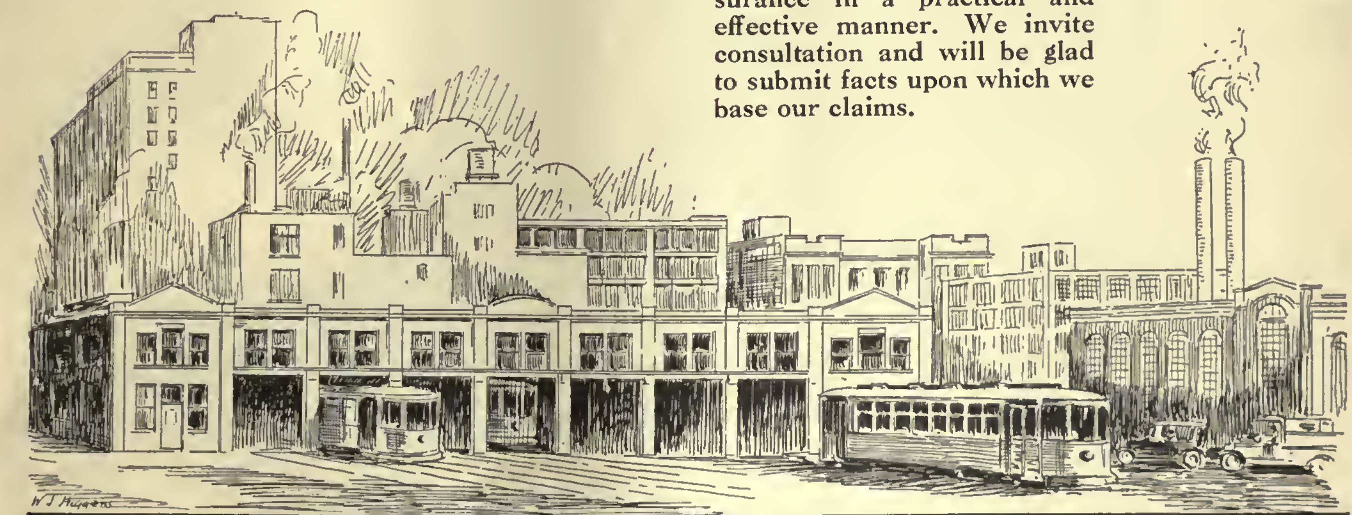
- Tornado and Windstorm

An understanding of Marsh and McLennan's conception of the word service will always be a determining factor among our clients.

For years we have rendered a highly specialized engineering service to the leading Public Utilities of America.

May we tell you more what insurance, plus Marsh and McLennan service, means to the business executive who would safeguard his profits, eliminate hazards and reduce his insurance cost?

Marsh and McLennan are qualified to handle your insurance in a practical and effective manner. We invite consultation and will be glad to submit facts upon which we base our claims.



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Winnipeg, Montreal, London

K-V STANDARDS

OF COMPARISON

as applied to

ARMATURE
and
AXLE BEARINGS

IN every field of railroad supplies there can only be *one* product that is "best".

Yet in each field, hundreds of different brands are purchased.

This proves that different Standards of Selection are applied, or more roads would find and standardize upon "the one best product" in each field.

The K-V Standards of Comparison provide the safest, surest and most scientific method of determining the one best "buy" in any field of purchase.

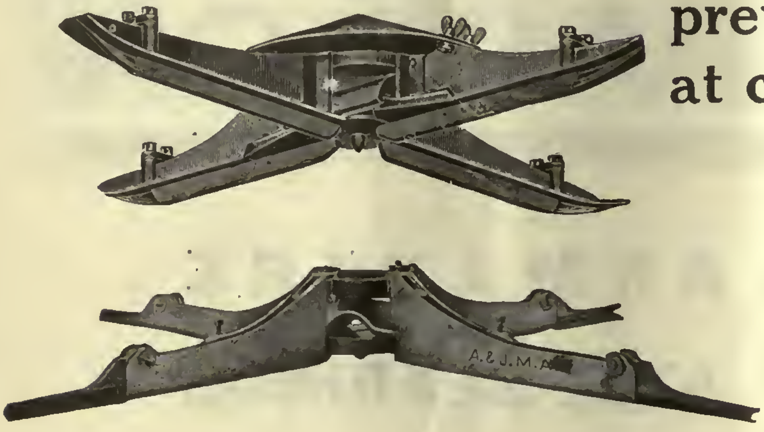
We will be glad to send you a complimentary copy of these Standards as applied to the correct selection of Armature and Axle Bearings.

While applying to Bearings only in this particular case, the method will suggest its own adaption to the purchase of supplies of every kind.

For this reason you will find the K-V Standards of general interest. Please request them on your business letterhead.

COLUMBIA MACHINE WORKS
and
MALLEABLE IRON COMPANY
ATLANTIC AVE. AND CHESTNUT ST.
BROOKLYN, N. Y.

ANDERSON CROSSOVERS



prevent wire breakage at crossover points

Anderson Crossovers are scientifically made to give long wear of both crossings and wires. The approach ears of bronze are pivoted to the main casting. This permits them to rise slightly with the approach of the trolley wheel, thus taking the wear off the wire and by preventing crystallization the danger of breaking is eliminated.

And though 25 per cent lighter than the ordinary crossing they are much stronger.

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Albert & J. M. Anderson Mfg. Co.

Established 1877

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W-S HYDRAULIC

You Can Bend Rails Quickly and Economically With a Watson-Stillman Hydraulic Rail Bender

Hydraulic Portable Rail Bender

The portable rail bender shown herewith is designed for use on the road. It is equipped with interchangeable formed bending blocks, and will make any bend without buckling. The hinged yoke permits the rails to be put in sidewise. It can also be used for other heavy bending.

We build many other handy tools for the railway shop. Such as: Crank Pin Presses, Wheel Presses, Forcing Presses, Forging Presses, Jacks, Pit Jacks, Punches, Shears, Pumps, Accumulators, etc.

Write for Catalogs.

The Watson-Stillman Co., 46 Church St., New York
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but not for long

Are you interested in eliminating unnecessary expense and delay due to derailments?

If so, make Reading Replacers a part of the equipment of every car. Reading Replacers are designed along lines which make them desirable for use on street railways.

Reading Replacers are made in two sizes and types. Calks are provided on bottom of Replacers to prevent sliding on any kind of pavement.

Write for particulars

AMERICAN CHAIN CO., Inc.

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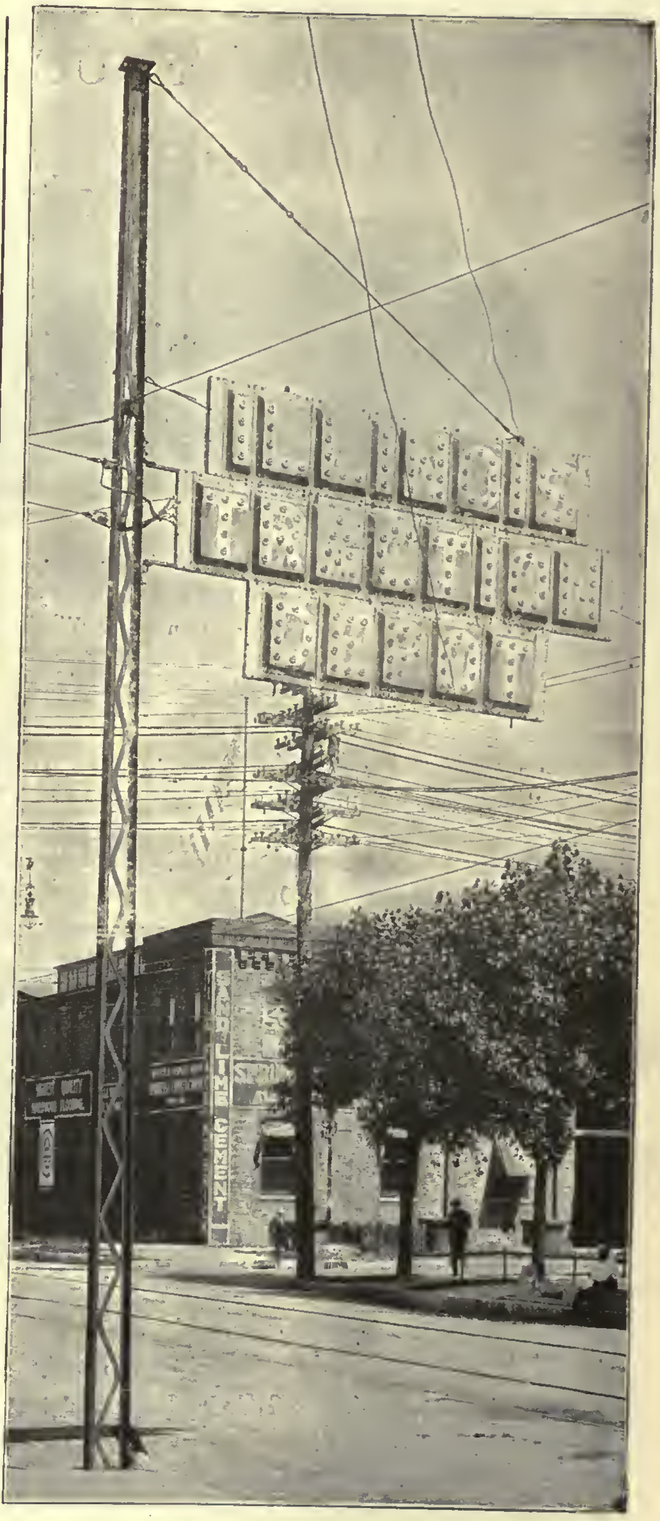
READING REPLACERS



Bates One-piece Poles Are Artistic

Perhaps Art is a secondary consideration when you plan your pole line construction, but it cannot be disregarded—especially when these poles are to be installed in exclusive residential districts or on your business blocks.

The combination of great utility and art with the lowest first cost makes the Bates Poles desirable for all types of pole line construction.

Our New 1921 TREATISE AND HANDBOOK sent upon request.

Bates Expanded Steel Truss Co.
208 South La Salle Street
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R. H.

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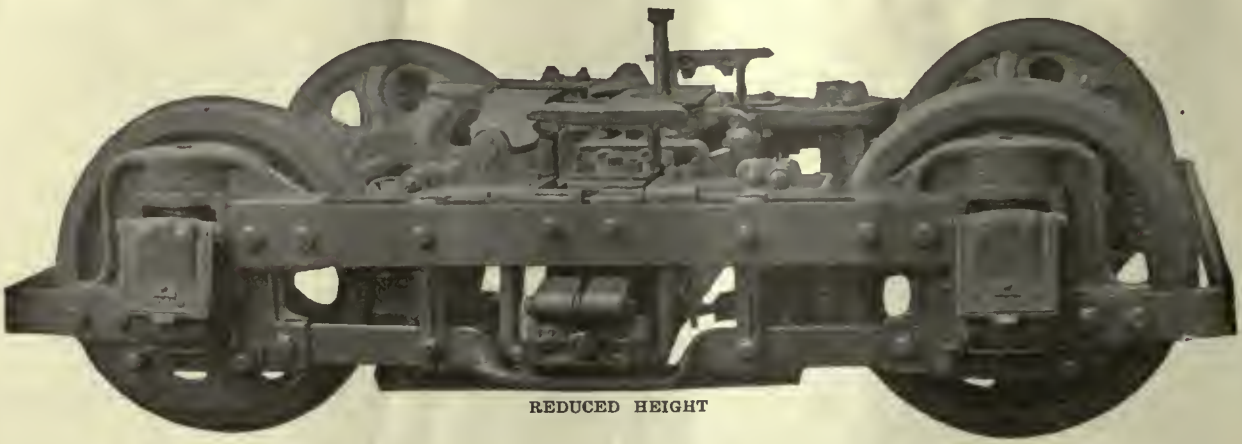

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Mounted on 26-in. Wheels with Springs Over Journal Boxes.
Designed to Mount Centre and End Entrance Cars Low Down.

SWING MOTION AND FULL ELLIPTIC SPRINGS

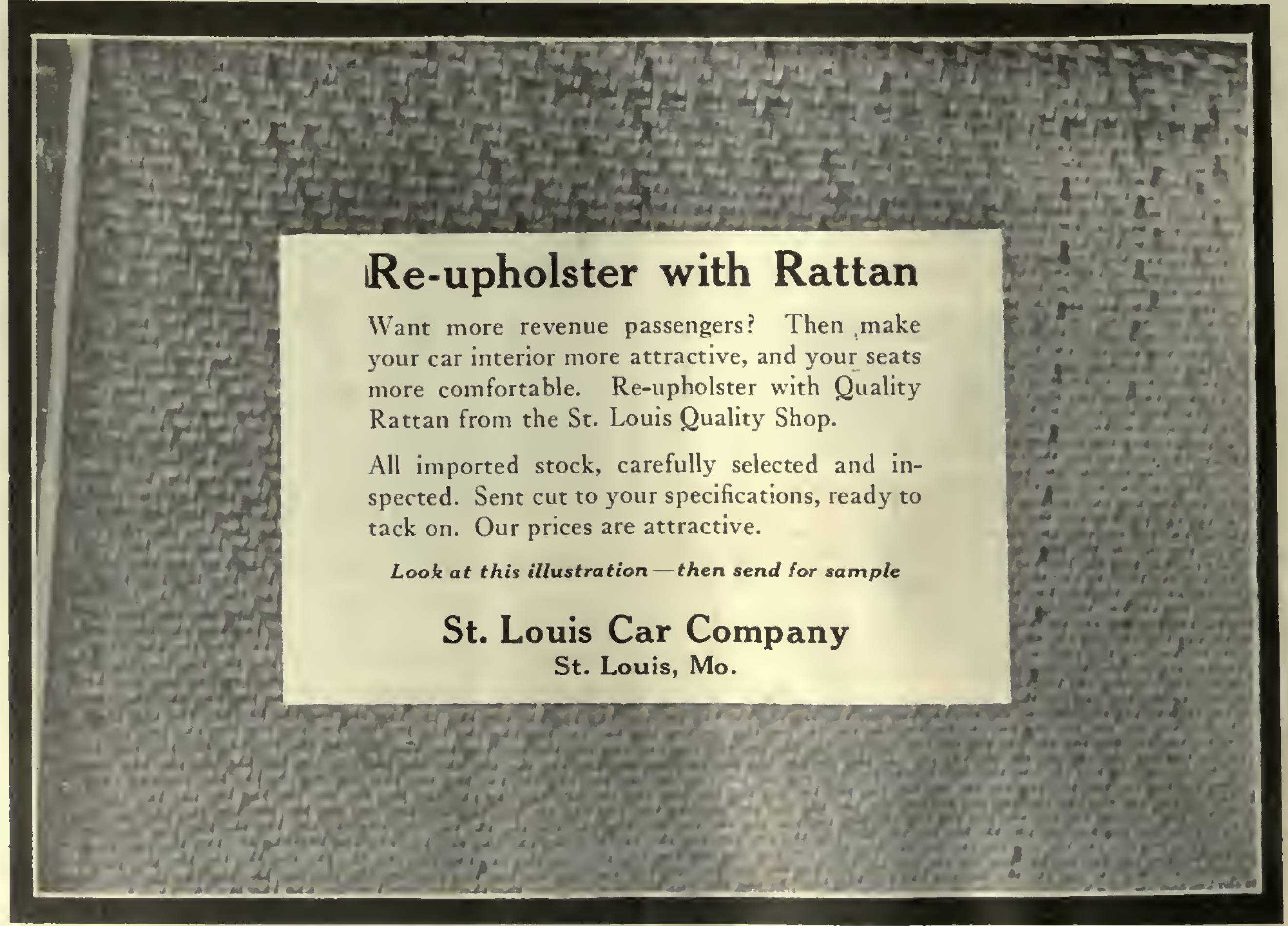
Wheel Base 5 ft. 2 in. For Car Bodies weighing 16,000 to 22,000 lb. Motors Inside Hung.

EASY RIDING

Journals 3¾ x 7 M. C. B. Type. Height from Rail to Body Bolster, 22¾ in. Brakes Inside Hung.

TAYLOR ELECTRIC TRUCK CO., TROY, N.Y.

SPECIFICATIONS ON REQUEST Established 1892 SEND FOR PORTFOLIO



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Want more revenue passengers? Then make your car interior more attractive, and your seats more comfortable. Re-upholster with Quality Rattan from the St. Louis Quality Shop.

All imported stock, carefully selected and inspected. Sent cut to your specifications, ready to tack on. Our prices are attractive.

Look at this illustration — then send for sample

St. Louis Car Company
St. Louis, Mo.

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PHILLIPSDALE, R.I.
Reg. U. S. Pat. Office

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No. 2

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REG. U.S. PAT. OFF.

Electric Railway Automatic Signals

for Accessibility and Reliability

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REG. U.S. PAT. OFF.
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Send for new Rail Bond book

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WRITE FOR OUR NEW DESCRIPTIVE CATALOG

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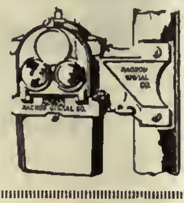
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Specialists In Street Railway Requirements
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High-Grade Track Work

SWITCHES—MATES—FROGS—CROSSINGS
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Shop-Built Thermit-Welded THERMIT WELDING **Frogs and Crossings**

Long lived, but cost only fraction of cost of solid manganese frogs. Unlike latter, they can be welded in place and built up, and they require no bonds. Easily and cheaply constructed in railroad shops by welding together spare pieces of rails.

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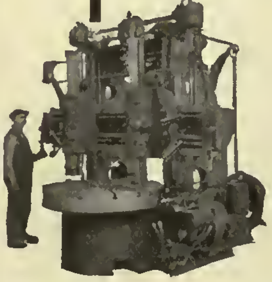

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FOR ELECTRIC RAILWAYS

Axle Lathes
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BARBOUR-STOCKWELL CO.
205 Broadway, Cambridgeport, Mass.
Established 1858

Manufacturers of
Special Work for Street Railways
Frogs, Crossings, Switches and Mates
Turnouts and Cross Connections
Kerwin Portable Crossovers
Balkwill Articulated Cast Manganese Crossings

ESTIMATES PROMPTLY FURNISHED

SPECIAL TRACKWORK
Of the well-known WHARTON Superior Designs *and* Constructions

STEEL CASTINGS
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GAS CYLINDERS
SEAMLESS STEEL

WM. WHARTON JR. & CO., Inc., Easton, Pa.
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ORIGINATORS OF
MANGANESE STEEL IN TRACKWORK

ERICO
ECONOMICAL
EFFICIENT
RAIL BONDS

THE ELECTRIC RAILWAY IMPROVEMENT CO.
CLEVELAND, OHIO

Nelsonville Filler and Stretcher Brick for T Rails

Makes permanent, light, level pavement with a minimum of paving repairs.

The Nelsonville Brick Co.
Columbus, Ohio

RAMAPO
Automatic Return Switch Stands for Passing Sidings
• Automatic Safety Switch Stands •
Manganese Construction • Tee Rail Special Work
RAMAPO IRON WORKS
HILLBURN • NEW YORK
Plants at Hillburn N.Y. and Niagara Falls N.Y. New York Office 30 Church St.

Peirce Forged Steel Pins with Drawn Separable Thimbles

Your best insurance against insulator breakage

Hubbard & Company
PITTSBURGH, PA.

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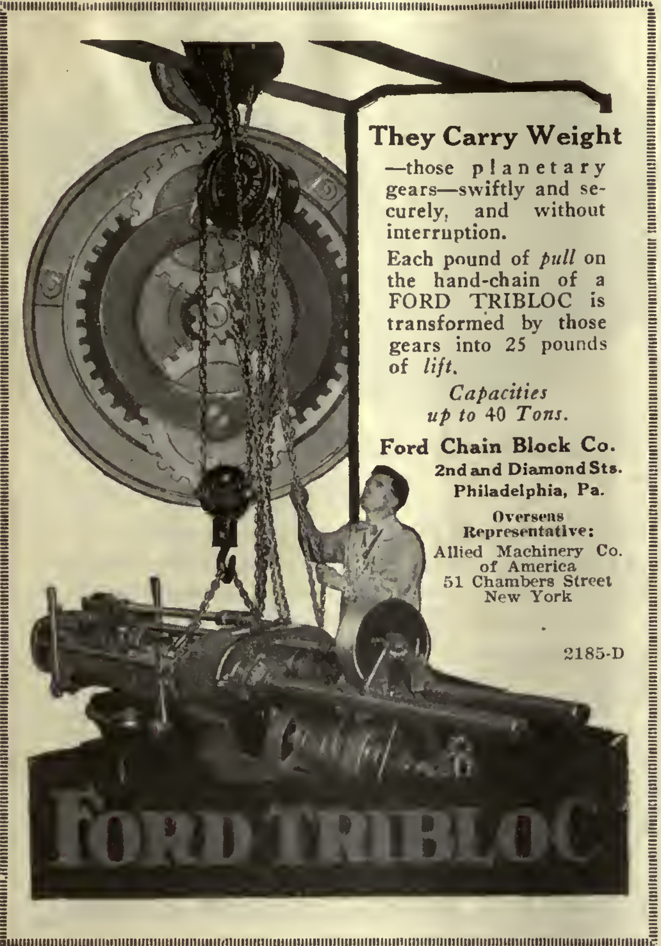
Electrical Machinery, Steam Turbines, Steam Engines, Condensers, Gas and Oil Engines, Air Compressors, Air Brakes.



They Carry Weight

—those planetary gears—swiftly and securely, and without interruption.

Each pound of *pull* on the hand-chain of a FORD TRIBLOC is transformed by those gears into 25 pounds of *lift.*

Capacities up to 40 Tons.

Ford Chain Block Co.
2nd and Diamond Sts.
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Overseas Representative:
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GEARS
OF
ROLLING STOCK
PROTECTED WITH

BORNE SCRYMSER COMPANY
METAL LIFE
FOR
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Builders since 1868 of Water Tube Boilers of continuing reliability

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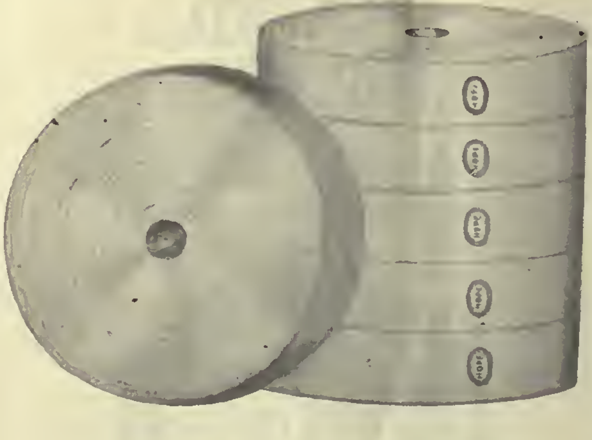

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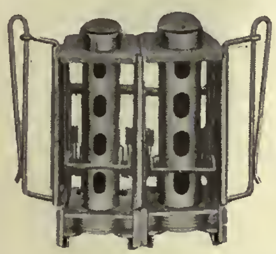

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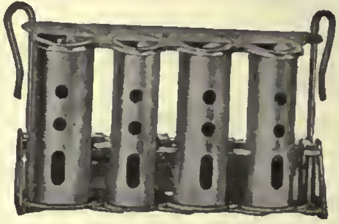

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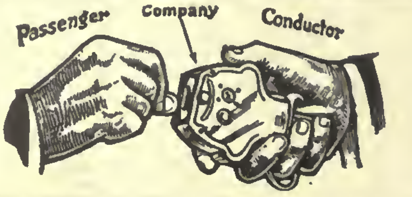

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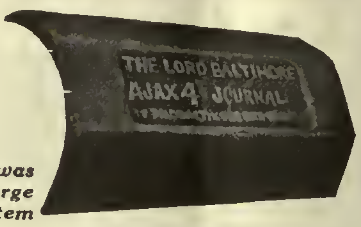

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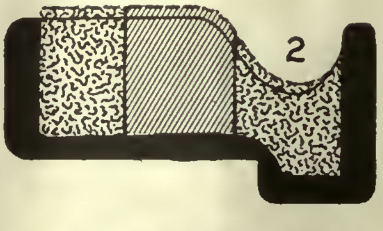

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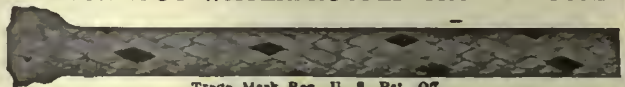

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3:00 P. M. (EASTERN TIME), OCT. 10th, 1921.

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Anchors, Guy
Electric Service Supplies Co
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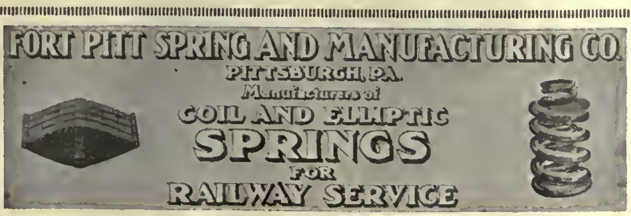
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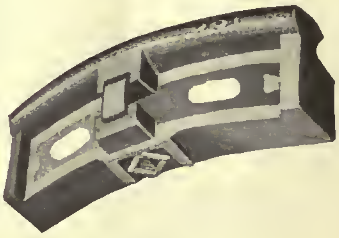

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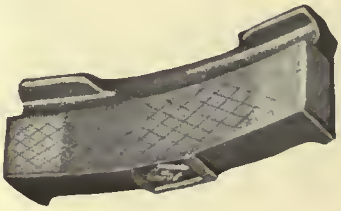

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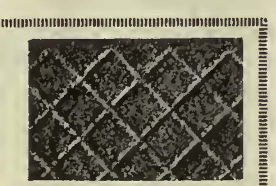

FERALUN Anti-Slip Treads
Car Steps
Floor Plates
Station Stairs
Door Saddles, etc.
AMERICAN ABRASIVE METALS CO.
50 Church St., New York City
It's iron and emery cast together

Bound Brook Trolley Wheel Bushings Give Longer and Better Service

THERE are more Bound Brook (Oil-less) Trolley Wheel Bushings in use today than all other makes combined. That is because Bound Brook Bushings, by virtue of their construction, invariably outlast all other types.

All Genuine Graphited Oil-less Bushings have always been made at Bound Brook, U. S. A.

BOUND BROOK OIL-LESS BEARING COMPANY
Bound Brook, New Jersey *Detroit Office: 1723 Ford Bldg.*

STUCKI SIDE BEARINGS
A STUCKI CO.
Oliver Bldg.
Pittsburgh, Pa.

MASON SAFETY TREADS
Standard for 25 years for car and station steps.
STANWOOD STEPS
Self-cleaning, non-slipping, light weight
KARBOLITH FLOORING
For steel cars—sanitary, fireproof, non-slippery
AMERICAN MASON SAFETY TREAD CO.
Lowell, Mass.
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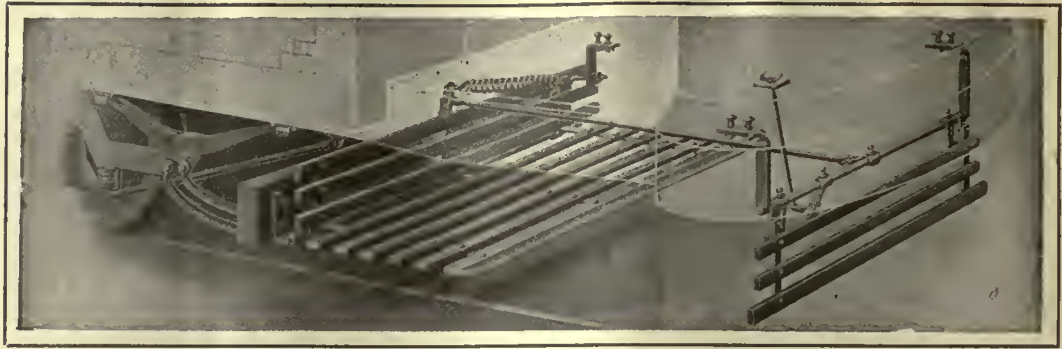
Joseph T. Ryerson & Son, Chicago, Western Distributors

HACKSAW HIGH SPEED GLADIUM BLADES ECONOMY EFFICIENCY
GLADIUM CO. Inc. 34 Cliff St. New York

Compare Them
The faint light of a candle and the strong rays of a searchlight. They represent the comparative efficiency of other ways of finding what you want and advertising for it in the
SEARCHLIGHT SECTION
Employment Equipment Business Opportunities
613

Since
1907
Other Ry. Motor Gear M'f'rs.
have brought out a total of
22 grades of gearing
each one "as good as Tool Steel"
BUT
Cincinnati "Tool Steel" is still
the Standard of Quality



—an accessory but not an afterthought!

Don't make the mistake of designing and building your cars first, then trying to buy or make a life guard or fender to fit in whatever space has accidentally been left.

H-B LIFE GUARDS
OR
PROVIDENCE FENDERS

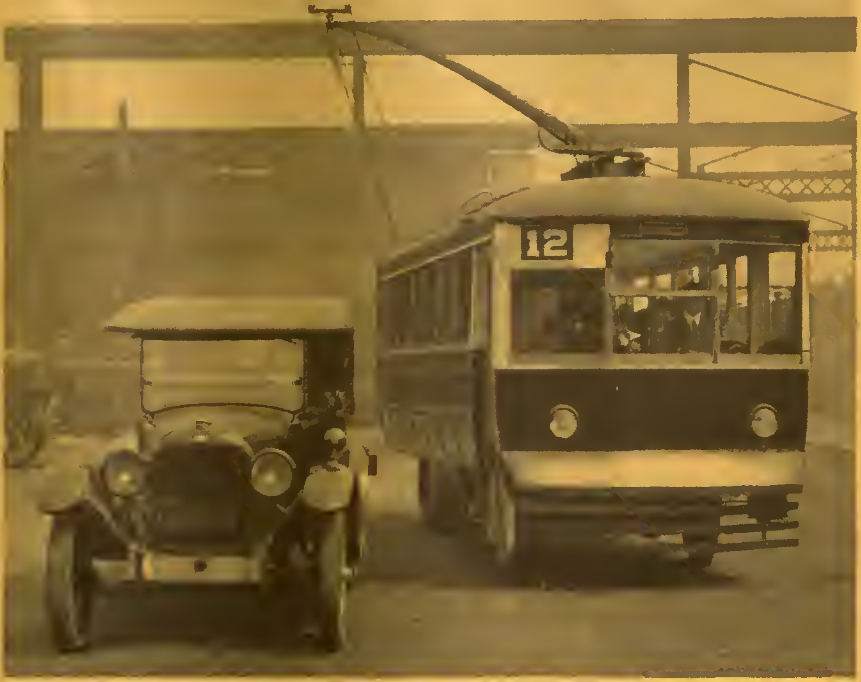
Accessories as Important as the Cars Themselves!

The appliances you use for the protection of human beings are just as vitally important as the equipment you use to transport them. You plan the car body, the motors, the trucks and all the transportation elements with great care and much thought as to their mutual relationships, the space they will occupy and the functions they will perform.

Give at least as much thought to the securing and attaching of suitable equipment for safeguarding the lives of people on the streets and highways through which your cars operate.

Specify H-B Life Guards for city cars and Providence Fenders for interurban cars, and see that the designer gets blueprints from us in advance, so as to allow for correct installation of this equipment.

The Consolidated Car Fender Co.
Providence, R. I.
General Sales Agent
Wendell & MacDuffie Co.
61 Broadway, N. Y.



Current Collector on Brill "Rail-less" Car a New Development

The Brill Current Collector was developed to enable the "Rail-less" Car to be operated in and around vehicular traffic with maximum efficiency. Its two under-wire sliding shoes engage the wire and an ingenious series of pivots permit operation as far as 16 ft. off center. In fact, with this type Collector the "Rail-less" Car may be turned within a diameter of 40 ft. without disengaging the wires.

Details of the Brill "Rail-less" Car and its equipment are included in our Bulletin No. 254. Copy will be mailed upon request.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO. — ST. LOUIS MO.
G. C. KUHLMAN CAR CO. — CLEVELAND, OHIO.
WASON MANF'G CO. SPRINGFIELD, MASS.
CANADIAN BRILL COMPANY, LTD., PRESTON, ONT., CANADA

MAINTAINING the maximum value of *car card space* to the *electric railways* means maintaining its value *to the advertisers.* Advertisers will keep buying space only so long as value measures up to definite standard

Sounds simple—but it can't be accomplished simply by a contractor buying car card space from the railways and re-selling it to advertisers. Space must be backed by a Service that creates car cards with real sales value.

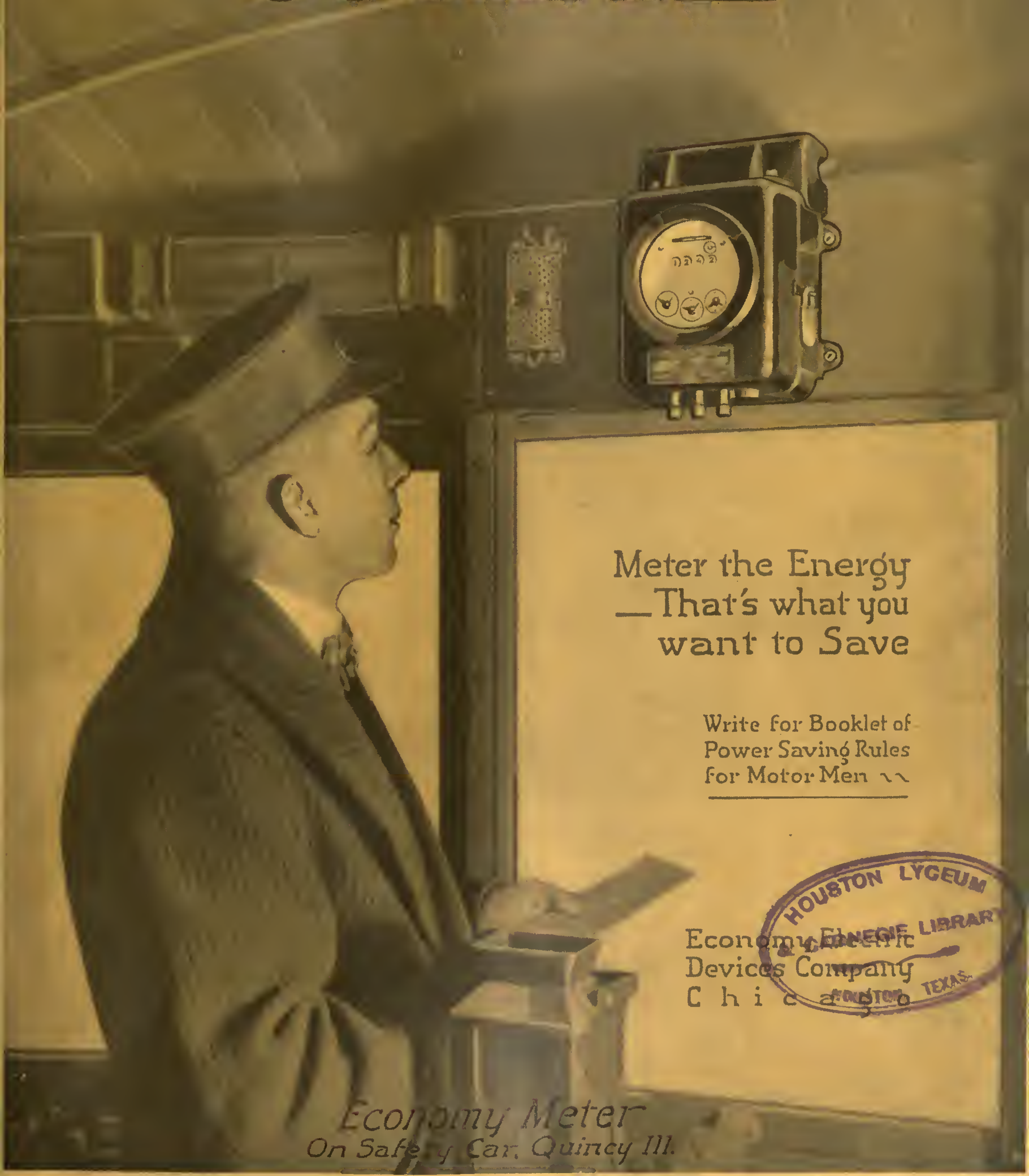
To satisfy national as well as local car advertisers it takes a *nation-wide organization.* Briefly, that is the function of the Collier Organization.

The Collier Organization permanently sustains car card space value at its highest point, hence pays the railways the highest income that can be paid continuously over a term of years.

Barron G. Collier
INCORPORATED
Candler Bldg., New York

Twenty Cents Per Copy October 8, 1921 McGraw-Hill Co., Inc.

ELECTRIC RAILWAY JOURNAL



Economy Meter
On Safety Car, Quincy Ill.

HOUSTON LYCEUM & CARNEGIE LIBRARY HOUSTON, TEXAS.

WESTINGHOUSE ELECTRIC

WHAT will extend the growth of the Electric Railway Industry?

Freight Haulage!

With freight transportation as a known revenue builder on some of the most prominent electric railway systems, others should hasten to participate in this business enterprise.

When community progress depends so largely upon the broad policies and ambitions of its local institutions, electric railways can secure a large share of both credit and return by furnishing efficient and adequate freight service.

Westinghouse quadruple No. 333-V, 125 hp., or No. 557-A, 140 hp. motors and HL control form standard equipments for freight and express cars on large roads that are now well established in freight transportation.

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

Westinghouse

Vol. 58, No. 15 New York, October 8, 1921 ***Pages*** **577-670**

Electric Railway Journal

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing-Editor

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The annual subscription rate is $4. Extra zone postage west of the Mississippi, and in Alaska, Hawaii, the Philippines, Porto Rico, Canal Zone, Cuba, Mexico, Honduras, Nicaragua, Dominican Republic, Salvador, Peru, Colombia, Bolivia and Shanghai, China, 50 cents. Extra postage in Canada, $1.50. Extra foreign postage $3 (total $7, or 29 shillings). Single copy 20 cents.

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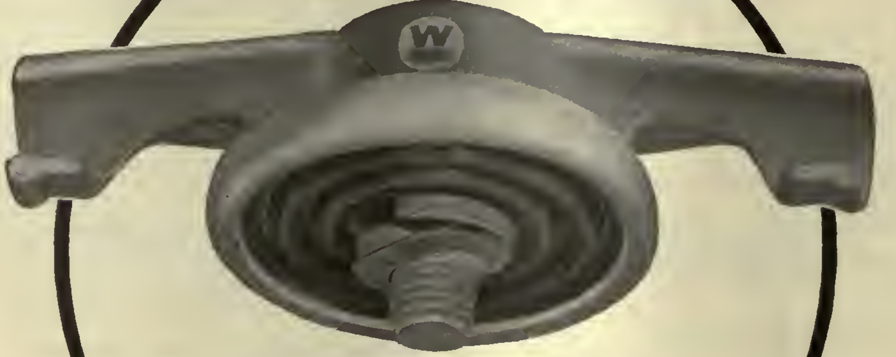
"Fittite"

The New Westinghouse Suspension Type B-1



Patent Applied For

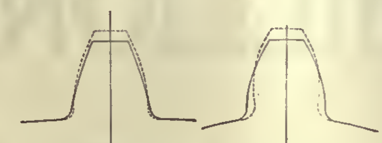
W
WESTINGHOUSE ELECTRIC

This suspension is similar to our well known Type B straight-line suspension, but has a longer stud fitted with a lock washer held in a recess by a thin copper washer. This enables the trolley ear to be aligned accurately and always assures a tight connection between the suspension and the trolley ear.

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.

Westinghouse

The Superiority of Nuttall Standard Helical Gears



Gear Pinion
Dotted line shows tooth-form 14½° involute. Solid line shows tooth-form of Nuttall Helicals

The Tooth Form

of the Nuttall Standard Helical Gear is of the long and short addendum type and has the following advantages over the 14-½° standard:

Increase in strength—250%

Increase in rolling contact—50%

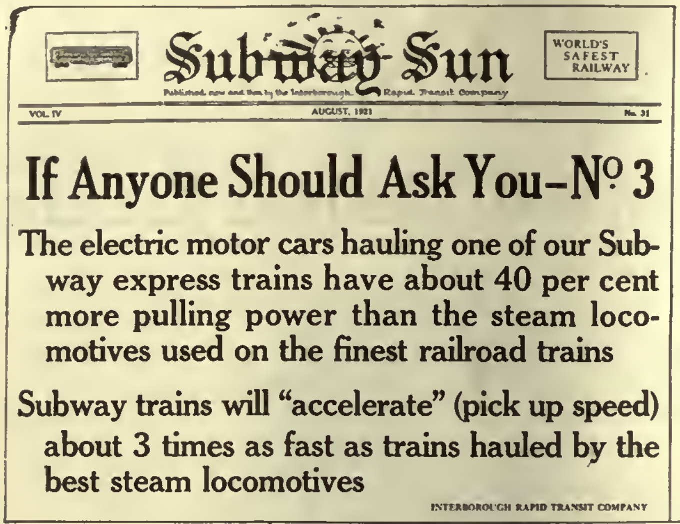
More metal between root of tooth and bore of pinion

R.D.NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

All Westinghouse Electric and Mfg. Co. District Offices are Sales Representatives in the United States for Nuttall Electric Railway and Mine Haulage Products.

Nuttall

SECONDS WORTH MILLIONS



Subway Sun

Published now and then by the Interborough Rapid Transit Company

WORLD'S SAFEST RAILWAY

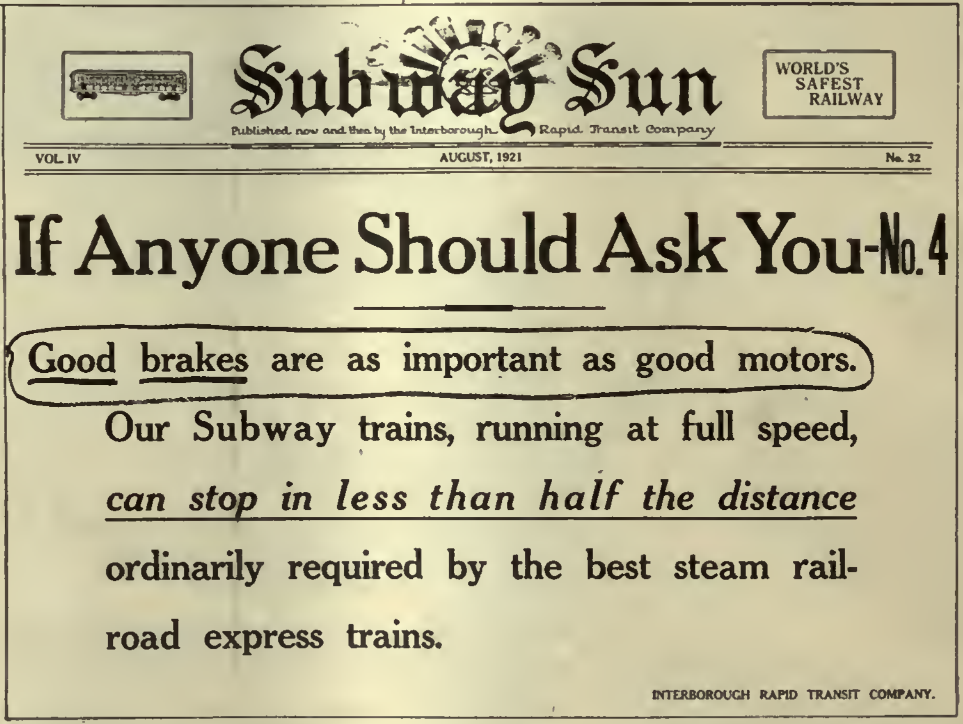
VOL. IV AUGUST, 1921 No. 31

If Anyone Should Ask You–No. 3

The electric motor cars hauling one of our Subway express trains have about 40 per cent more pulling power than the steam locomotives used on the finest railroad trains

Subway trains will "accelerate" (pick up speed) about 3 times as fast as trains hauled by the best steam locomotives

INTERBOROUGH RAPID TRANSIT COMPANY



Subway Sun

Published now and then by the Interborough Rapid Transit Company

WORLD'S SAFEST RAILWAY

VOL. IV AUGUST, 1921 No. 32

If Anyone Should Ask You-No. 4

Good brakes are as important as good motors.

Our Subway trains, running at full speed, *can stop in less than half the distance* ordinarily required by the best steam railroad express trains.

INTERBOROUGH RAPID TRANSIT COMPANY.

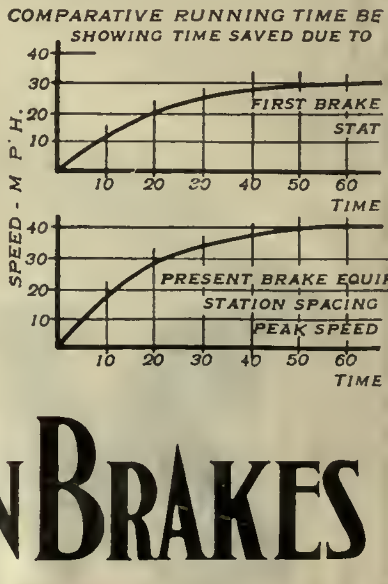
Two of a series of car bulletins recently displayed in the New York Subways by the Interborough Rapid Transit Company.

THE Interborough Rapid Transit Company has never underestimated the value of "good brakes."

"Good brakes" enabled the Interborough to develop limited track facilities to a point where it could safely operate sufficient trains to accommodate the dense traffic originating in a city of seven million.

The capacity of the system when opened for operation in 1904 was 350,000 passengers a day. By taking advantage of opportunities to increase the efficiency of its brakes, the original subway today carries about 1,250,000 each 24-hour period. This remarkable gain is due, among other things, to increased speed, larger trains and greatly shortened headway, made possible by better brakes.

Time is the most precious element involved in the operation of New York's subways. It has been said that seconds are worth millions. The history of the Interborough proves that time saving is a matter of braking facilities. The accompanying chart affords an interesting comparison of time consumption in train movement between stations yesterday and today. Note the sharp deceleration curve under present conditions. A saving of 20 seconds to each minute has been accomplished by "good brakes" in the last 15 years.



WESTINGHOUSE TRACTION BRAKES

TIME ECONOMY—

The Problem of Deceleration as Related to Acceleration

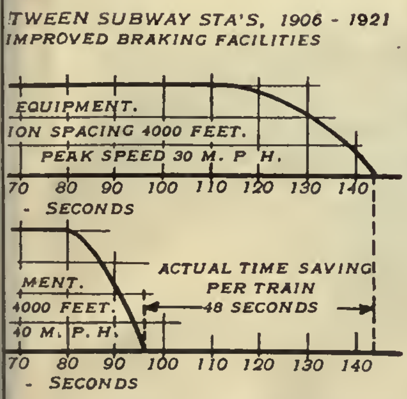
Brakes the Controlling Factor

GOOD motors, providing quick and powerful acceleration, are naturally responsible for much of the improvement shown during the last 15 years in Subway transportation, but the Interborough Rapid Transit Company realizes that the ability to move trains at all depends on the ability to control them, and this conviction is expressed in the statement that "Good brakes are as important as good motors."

Increasing the capacity of the motors alone is of no advantage beyond a certain point; there must also be a corresponding increase in braking force. Early in its career the Interborough established the fact that further development of its motive power would depend primarily on its ability to secure appropriate braking facilities. When these facilities were supplied by the Westinghouse Traction Brake Company, in the form of the Electro-Pneumatic brake equipment (together with the Westinghouse Governor Synchronizing System, Automatic Car and Air Couplers, and Compressors), it became possible to increase speeds, lengthen trains, extend car capacity, shorten block signal spacings (permitting greatly reduced headway), and operate 50 per cent more trains with the same track mileage.

The subsequent increase in traffic capacity from 350,000 to 1,250,000 is largely the result of the time saving effected in train movement by means of better braking facilities.

THERE is a Westinghouse brake especially adapted for every class of Electric Railway service, each type as efficient in its particular field as that used in high-speed Subway operations, and each designed in the interests of human safety, time economy and general traffic betterment.



Westinghouse Traction Brake Company

General Offices and Works: Wilmerding, Pa.

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Boston, Mass.
Chicago, Ill.
Columbus, O.
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Mexico City
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St. Louis, Mo.

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Washington
Seattle
San Francisco

WESTINGHOUSE TRACTION BRAKES

Phono-Electric

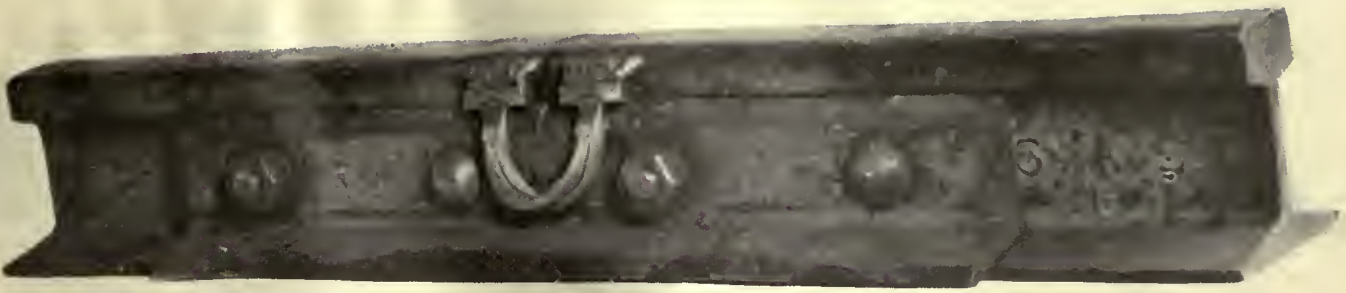
Trouble-free in Dallas, Texas

Phono-Electric Trolley Wire—nearly 20 miles of it—was put up on Main, Commerce and Elm Streets, the *busiest* thoroughfares of the Giant of the Southwest.

Of this installation put up at Elm and Lemar Streets in 1910, the word is "just as good as ever—never any trouble."

With such service as this, the company's practice to standardize on Phono-Electric Trolley Wire for heavy service is understandable. It appreciates that the little difference in the first cost is a very small premium indeed for the insurance of safe, reliable overhead power supply.

Bridgeport Brass Company
Bridgeport Connecticut



O-B Type AW-3 Bond (Patented)

90° welding angle and steel welding surface—the ideal combination for easy electric welding. Copper shielded from intense arc heat. Cable life lengthened by copper sleeve. Made in various capacities and also for base-of-rail application.

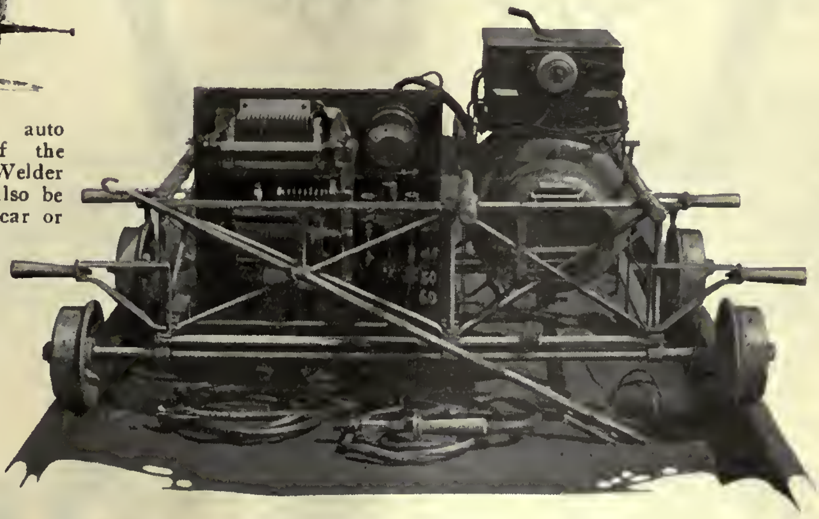
Wilson Plastic-Arc Rail Bond Welder Does All Welding Well

An eastern street railway has three Wilson Plastic-Arc Rail Bond Welders busy building up cupped rail joints In Canada a property is using one for bonding alone. In two southern cities these welders are used for both track work and rail bonding.

Wherever and however it's used, the Wilson Plastic-Arc Welder does a good job. Its automatic current control and its short arc teach every operator the secret of the master welder—uniform heat in the weld.

This machine is capable of continuous duty inside or out. It saves money in the repair shop as well as on the track.

For city work this auto trailer mounting of the Wilson Plastic-Arc Welder is convenient. May also be furnished on a hand car or with its own wheels as illustrated at the right.



Wound for two voltage ranges; 175 to 350 Volts D.C. and 350 to 700 Volts D.C. The machine operates successfully on wide line voltage variation.

Descriptive Booklet free on request.

The Ohio Brass Co.
Mansfield, Ohio, U.S.A.

New York Philadelphia Pittsburgh Charleston, W.Va. Chicago Los Angeles San Francisco Paris, France
Products: Trolley Material, Rail Bonds, Electric Railway Car Equipment, High Tension Porcelain Insulators, Third Rail Insulators

A Sign for

ELECTRIC SERVICE
TRADE
MARK
SUPPLIES COMPANY

- ☐ *Faraday Car Signals*
- ☐ *Keystone Trolley Catchers*
- ☐ *Shelby Trolley Poles*
- ☐ *Samson Cordage*
- ☐ *International Fare Registers*
- ☐ *Keystone Air Sanders*
- ☐ *Golden Glow Headlights*
- ☐ *Illuminated Destination Signs*
- ☐ *Keystone Steel Gear Cases*
- ☐ *Safety Car Lighting Fixtures*
- ☐ *Fare Register Fittings*
- ☐ *Keystone Air Valves*
- ☐ *Keystone Cord Connectors*
- ☐ *Keystone Rotary Gongs*
- ☐ *Standard Trolley Harps*
- ☐ *Standard Trolley Wheels*
- ☐ *Automatic Door Signals*
- ☐ *Keystone Motormen's Seats*

ELECTRIC SERV

Manufacturer of Railway Mat

PHILADELPHIA
17th and Cambria Streets

NEW YORK
50 Church St.

the Better

THE Keystone mark is a sign for the better in specialties for reconstructed cars, safety cars, interurban cars and trolley buses.

Better service follows each installation as our numerous repeat orders go to show. Detroit's first, second and third orders for safety cars have specified Keystone Specialties. (See our ad in Sept. 24 issue of Electric Railway Journal.)

A greater proportion of safety and one-man cars will be operated this winter. For them you will need:

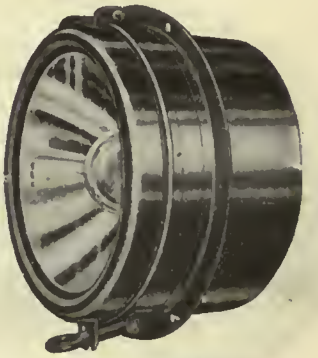
- **Good strong but light gear cases**
- **Dependable air sanders**
- **Good strong trolley poles**
- **Reliable trolley catchers**
- **Strong penetrating headlights**
- **Car illumination that invites the shivering pedestrian**
- **Destination signs that can be seen**

You will find all of these on the list that bears the Keystone mark—the sign for the better.

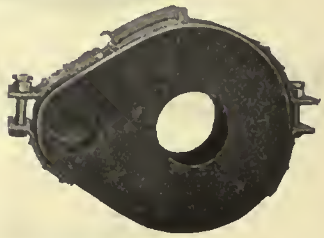
More trolley buses will be operated next spring. Now is the time to specify the following equipment for them:

- **Golden Glow Headlights**
- **Keystone-Hunter Illuminated Signs**
- **Faraday High Voltage Signals**
- **Keystone Rotary Gongs**

Send for the respective data sheets at once.



Golden Glow Headlights



Keystone Steel Gear Cases

Keystone-Hunter Destination Signs

Faraday High Voltage Car Signal System

ICE SUPPLIES Co.

erial and Electrical Supplies

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Branch Offices:
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CO., Ltd., Montreal, Toronto

National Pneumatic

The All-Enclosed Car

Modernize! *Pneumatize!*

Prepayment and postpayment cars put the conductor at or near the passenger-way, where he belonged, to avoid platform accidents.

But it was not until the creation of National Pneumatic Door and Step Control and associated signal devices that the conductor was able to concentrate on the safe handling of, and efficient fare collection, from the passenger.

While the motorman was enabled to keep "eyes front" on prepayment cars or to become a valuable aid in the interchange of passengers on postpayment cars.

Thus the 100 per cent safe, all enclosed car is the direct outcome of National Pneumatic creativeness and experience in surface car equipment.

The National Pneumatic Line Comprises

Door and Step Control
Motormen's Signal Lights
Door and Step Operating Mechanism
Safety Interlocking Door Control
Multiple Unit Door Control

Manufactured in Canada by
Dominion Wheel & Foundries, Ltd.
Toronto, Ont.

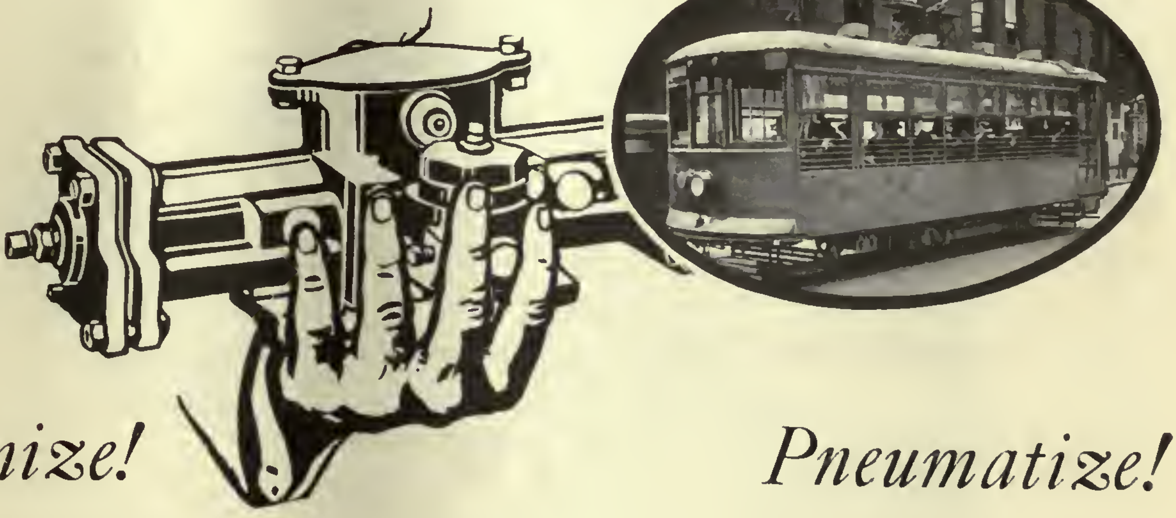
NATIONAL PNEUM

Works at

50 Church St., New York

Creations Made Possible

The Safety Car



Modernize! *Pneumatize!*

At the core of the safety car apple is the pneumatic engine—a large factor indeed in the laborless operation of the safety interlocking apparatus on this wonderful car.

If the doors and steps of these one-man cars had to be operated by hand, it would have been impossible to operate these cars in any but the lighter services. But with the air-operated engine, the safety car finds application even on some routes in the largest cities of the continent—the one most effective way to keep the jitneys out of the running.

It is noteworthy that every Safety Car door engine in use today is of National Pneumatic creation and manufacture.

The National Pneumatic Line Comprises

Door and Step Control
Motormen's Signal Lights
Door and Step Operating Mechanism
Safety Interlocking Door Control
Multiple Unit Door Control

ATIC COMPANY, Inc.

Rahway, N. J.

Edison Bldg., Chicago

Manufactured in Canada by
Dominion Wheel & Foundries, Ltd.
Toronto, Ont.

The FIFTH AVENUE

Designers, Manufacturers

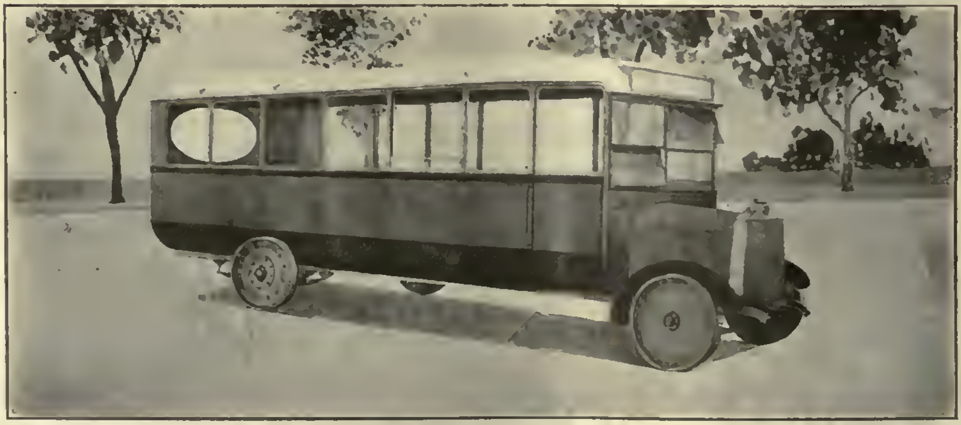
Standard High-Speed, Single Deck, One Man Buses

are in position to offer to the trade on most advantageous terms a limited number of their TYPE "A" vehicles *now* in service on Fifth Avenue, New York City.

These 'buses have been especially designed and constructed around our many years of experience as operators of a public utility. Their mechanical excellence and general adaptability to public service has been largely instrumental in the success of our undertaking.

To those contemplating the introduction of 'bus service as a means of amplifying and supplementing street car service the engineering, transportation, mechanical, accounting and legal experience of this organization is at their disposal.

Inquiries Solicited



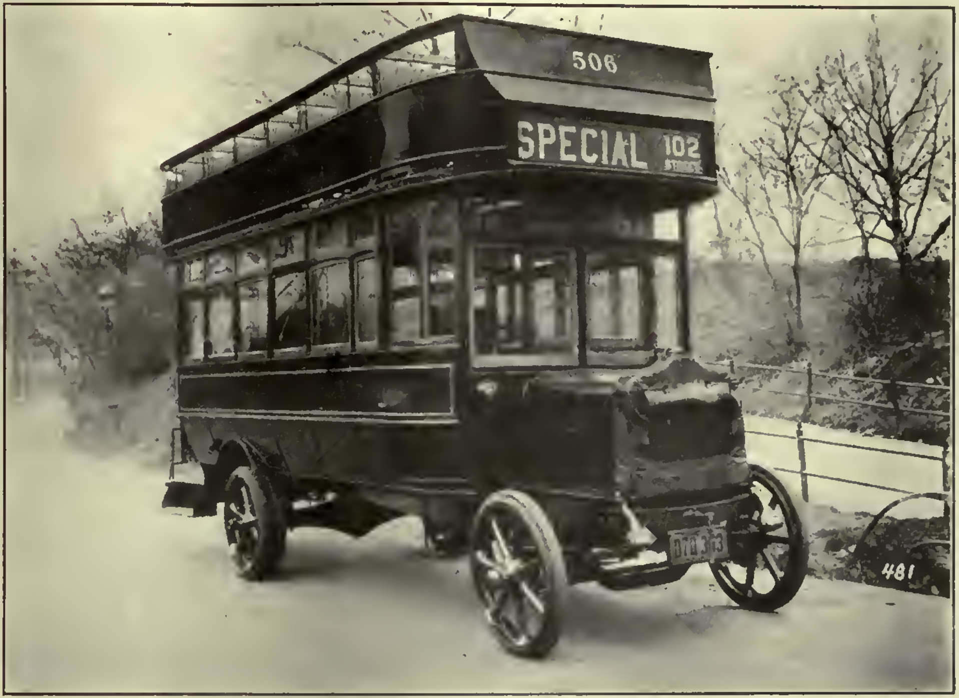
Type J—30 *Passenger*

FIFTH AVENUE COACH COMPANY,

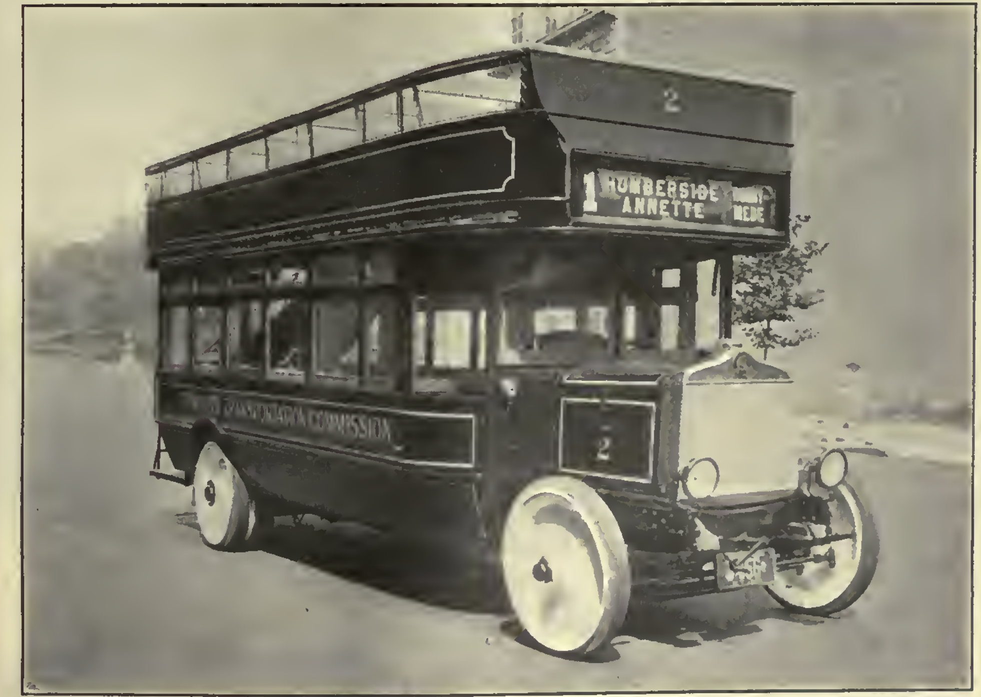
COACH COMPANY

and Operators of

and Standard Low Level, Double Deck, Two Men Buses



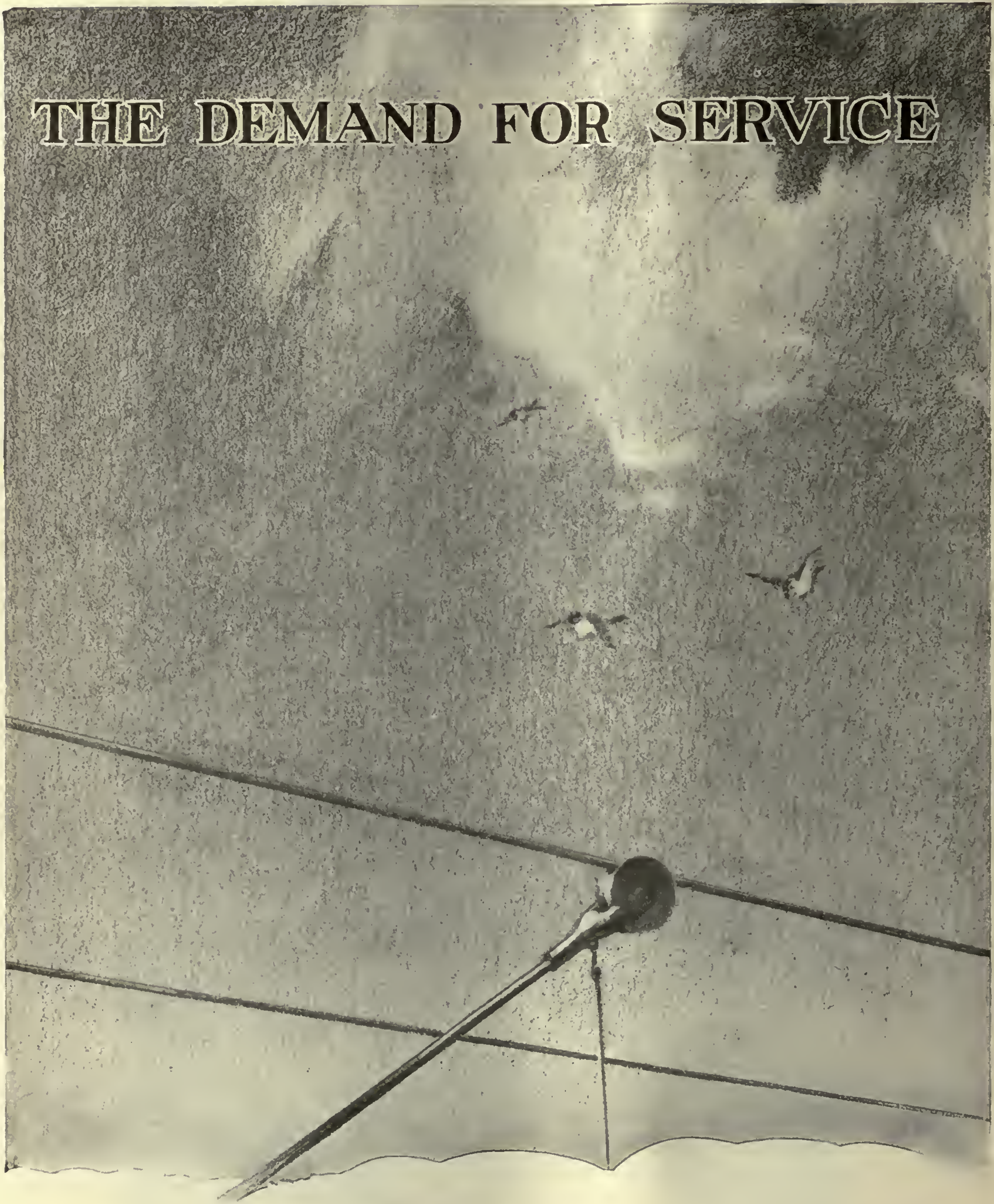
Type A—51 *Passenger*



Type L—51 *Passenger*

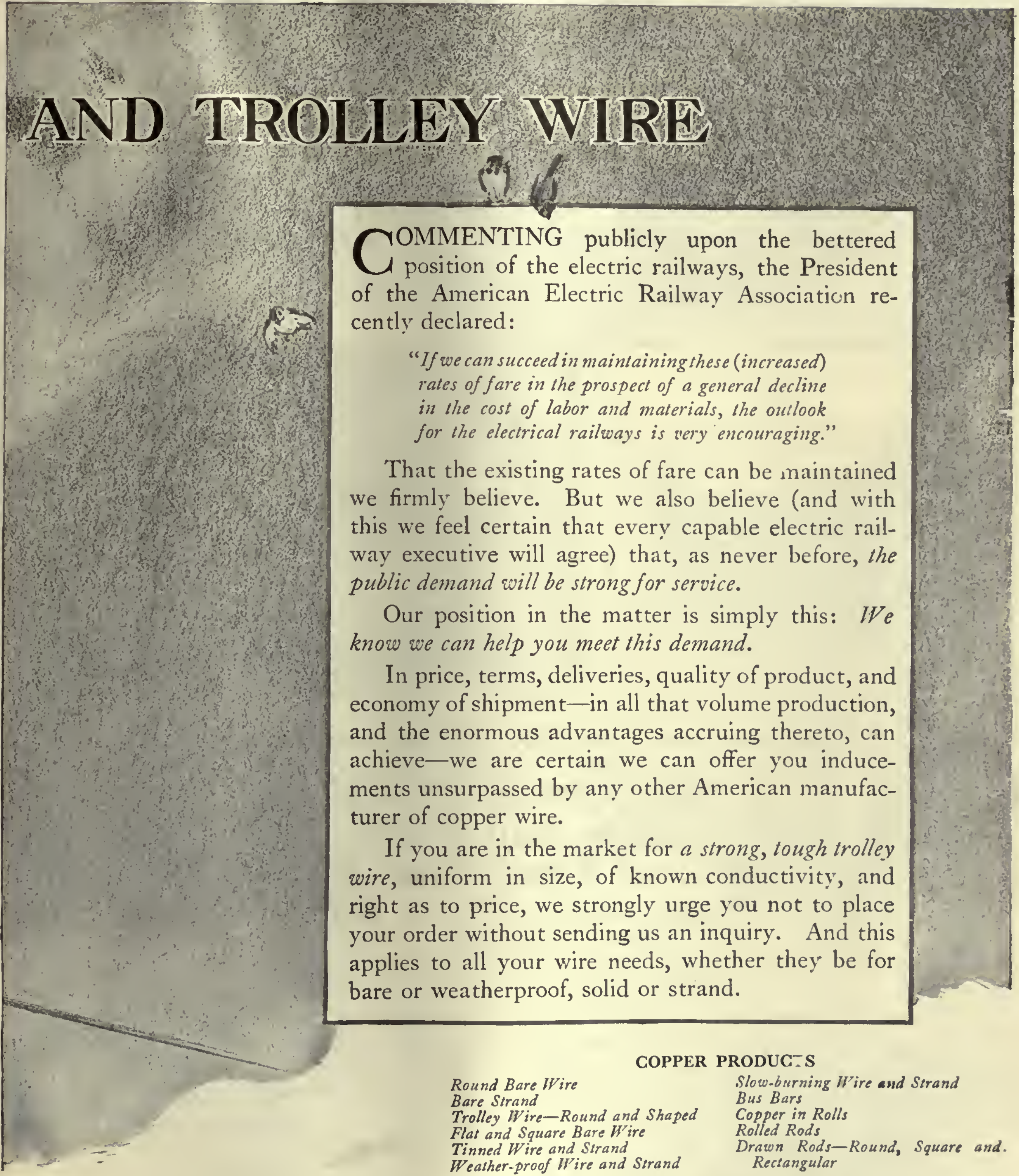
Seventy-four buses of this type are now in operation in Detroit, Mich., and Toronto, Can.

10 East 102d Street, NEW YORK CITY



Mills—Bayway, N. J.

AMERICAN COPPER PRODUCTS
CORPORATION
200 BROADWAY NEW YORK



COMMENTING publicly upon the bettered position of the electric railways, the President of the American Electric Railway Association recently declared:

> *"If we can succeed in maintaining these (increased) rates of fare in the prospect of a general decline in the cost of labor and materials, the outlook for the electrical railways is very encouraging."*

That the existing rates of fare can be maintained we firmly believe. But we also believe (and with this we feel certain that every capable electric railway executive will agree) that, as never before, *the public demand will be strong for service.*

Our position in the matter is simply this: *We know we can help you meet this demand.*

In price, terms, deliveries, quality of product, and economy of shipment—in all that volume production, and the enormous advantages accruing thereto, can achieve—we are certain we can offer you inducements unsurpassed by any other American manufacturer of copper wire.

If you are in the market for *a strong, tough trolley wire,* uniform in size, of known conductivity, and right as to price, we strongly urge you not to place your order without sending us an inquiry. And this applies to all your wire needs, whether they be for bare or weatherproof, solid or strand.

COPPER PRODUCTS

Round Bare Wire
Bare Strand
Trolley Wire—Round and Shaped
Flat and Square Bare Wire
Tinned Wire and Strand
Weather-proof Wire and Strand
Slow-burning Wire and Strand
Bus Bars
Copper in Rolls
Rolled Rods
Drawn Rods—Round, Square and Rectangular

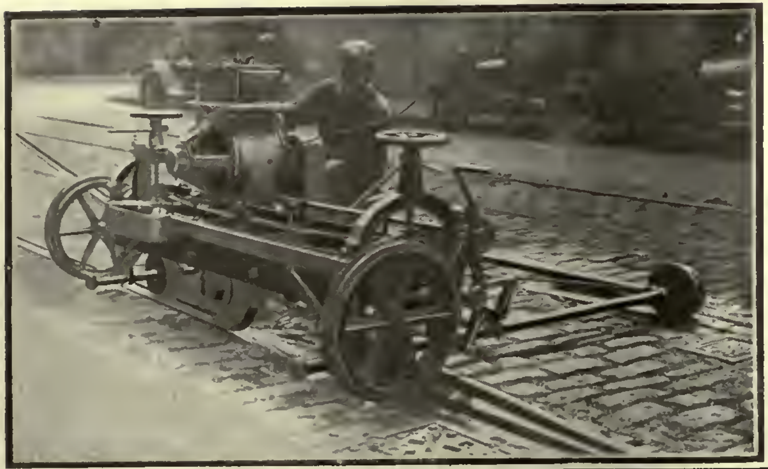
BRASS AND BRONZE PRODUCTS

Brass and Bronze Sheets
Brass and Bronze Round Wire
Brass and Bronze Flat and Square Wire

MILLS—BAYWAY, N. J.

AMERICAN COPPER PRODUCTS CORPORATION

200 BROADWAY NEW YORK



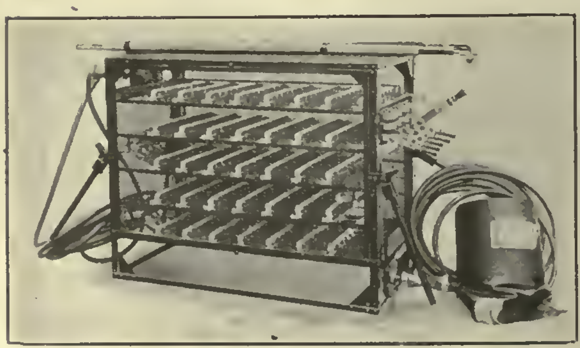
Modern Methods

in an Old City

The extensive track rehabilitation program on the Boston Elevated Railway Company's surface lines, is being carried out with the aid of every successful modern labor-saving device available. Above is shown an Atlas Rail Grinder at work, the other view showing the ease with which it is rolled aside to permit undelayed passage of cars.

Rehabilitate Your Track by Welding and Grinding with

Ajax Electric Arc Welder
Atlas Rail Grinder
Universal Rotary Track Grinder
Reciprocating Track Grinder



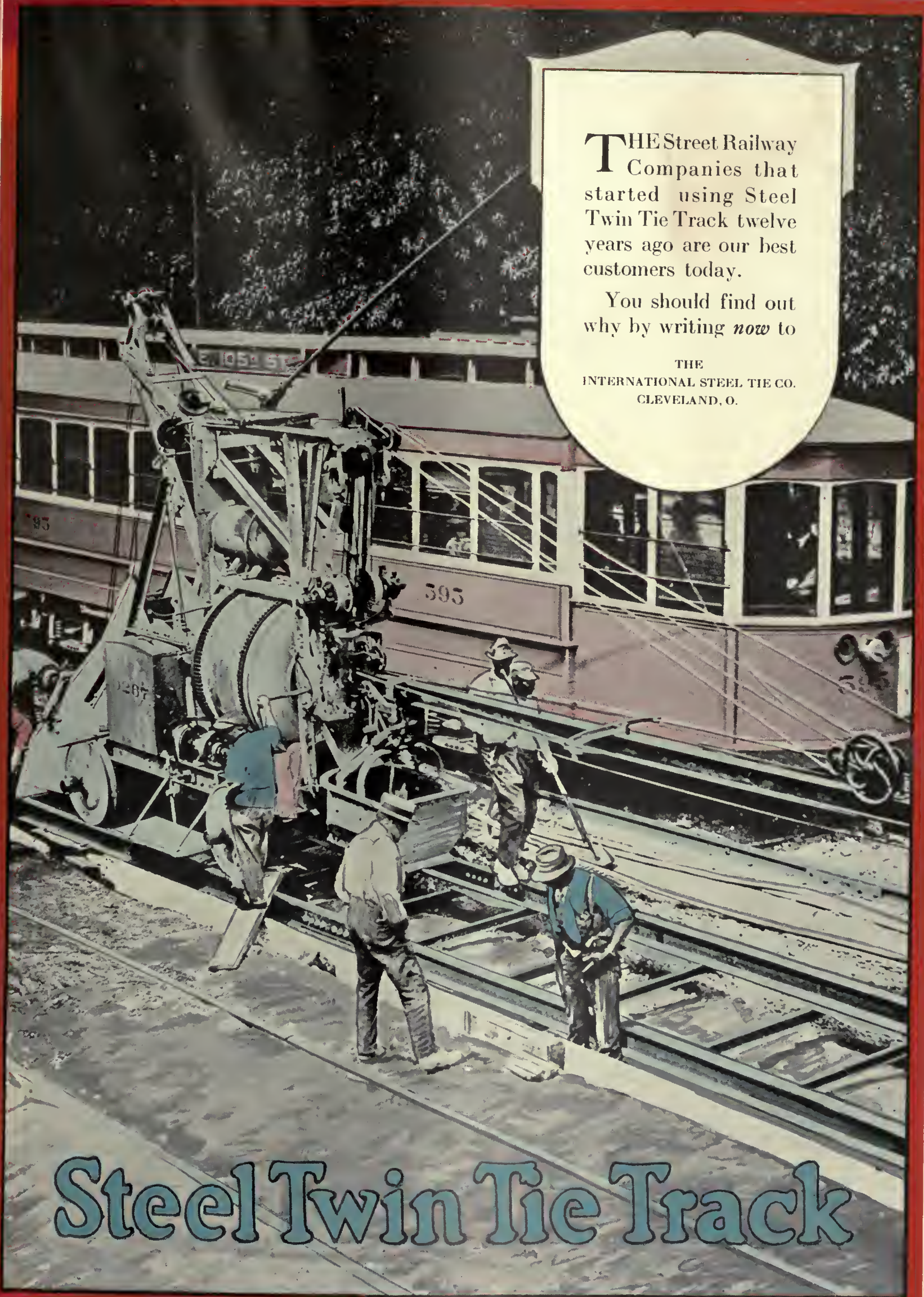
AJAX ELECTRIC ARC WELDER

Financial circumstances beyond your control may have caused you to defer track maintenance during the past two or three years of extreme stress. As a result many miles of track probably seem to be in pretty nearly desperate condition.

It still costs too much to rebuild track, unless absolute necessity compels, but several crews of moderately paid track men, equipped with our welding and grinding apparatus, can put seemingly hopeless track in good operating condition in remarkably short time.

Order additional equipment now!

Railway Trackwork Co.
3132-48 E. Thompson St.
Philadelphia, Pa.



THE Street Railway Companies that started using Steel Twin Tie Track twelve years ago are our best customers today.

You should find out why by writing *now* to

THE
INTERNATIONAL STEEL TIE CO.
CLEVELAND, O.

Be not the first by whom
the new is tried.
Nor yet the last to lay the
old aside.

--*Pope*

For prices on the latest type of Steel Twin Tie Track, address

THE
INTERNATIONAL STEEL TIE CO.
CLEVELAND, O.

Steel Twin Tie Track

"SHELBY"

SEAMLESS COLD DRAWN STEEL

TROLLEY POLES

The resilient, durable poles of high effiency

"SHELBY" SEAMLESS COLD DRAWN STEEL TROLLEY POLES are made from a selected grade of basic open hearth steel of about .17 per cent carbon, low in phosphorus and sulphur. Prior to the last cold drawing operation, the material is given a special heat treatment which leaves the grain in the finest condition. The elastic limit in the finished pole is from 60,000 to 70,000 pounds per square inch.

Recent improvements have been made in the methods of manufacture, particularly in the method of inserting the reinforcement. As now made, the reinforcement is integral with the body of the pole, which adds materially to its efficiency.

Details regarding structure and tests are given in a booklet entitled "The 'SHELBY' Seamless Cold Drawn Steel Trolley Pole". Ask for your copy today.

STEEL FOR SERVICE

NATIONAL TUBE COMPANY, PITTSBURGH, PA.

General Sales Offices: Frick Building

DISTRICT SALES OFFICES

Atlanta Boston Chicago Denver Detroit New Orleans New York Salt Lake City Philadelphia Pittsburgh St. Louis St. Paul

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"Tisco"
Manganese
Steel

SPECIAL TRACK
WHARTON

Two Views of a Special Trackwork Layout Manufactured by *Wharton* for M. & J. B. McHugh,

The switches, frogs and crossings in this yard have "TISCO" Manganese steel parts at points subject to severe wheel wear. Wharton was largely instrumental in introducing Manganese Steel elevated special trackwork in New

WM. WHARTON Jr. &

Originators of
Manganese Steel Track Work

SALES OFFICES:

Boston, Mass. **Denver, Col.** **Philadelphia, Pa.** **San Francisco, Calif.**
Chicago, Ill. **New York City** **Pittsburgh, Pa.** **Scranton, Pa.**

WORK of QUALITY

"Tisco"
Manganese
Steel

Contractors, and Installed in the Bridge Street Yard of the Frankford Elevated Railway.

York, Boston and Chicago, and a very great measure of its success may be attributed to the well known "TISCO" Manganese Steel. Let us solve your surface, elevated and steam railway special trackwork problems.

CO., Inc., Easton, Penna.

Subsidiary of
Taylor-Wharton Iron & Steel Co.
(Founded 1742)

OTHER PLANTS:

Taylor-Wharton Iron & Steel Co.
High Bridge, N. J.

Philadelphia Roll & Machine Co.
Philadelphia, Pa.

Tioga Steel & Iron Co., Philadelphia, Pa.

A careful, unbiased survey of all classes of
angle of life, cost or the ultimate economy
convince you that Thermit Shop-Welded

Here's the evidence in the case:

	Solid Manganese Special Work	Hard Center Special Work	Shop-Built Thermit Special Work
Life	Cannot be built up or repaired.	In practical service tests where Thermit welded frogs have been installed to replace broken manganese steel center frogs, the Thermit frogs were found to have outlasted the insert frogs.	Installations have given, and are still giving, perfectly satisfactory service for periods up to about six years. Any damage to joints can be repaired by the addition of metal by means of the electric welder.
Cost	Around 8 times cost of Thermit special work.	Around 4 times cost of Thermit special work.	Only a fraction of cost of solid manganese and hard center frogs because the Thermit frogs can be conveniently welded in local shops using spare pieces of rail on hand.

THERMIT

Metal & Thermit Corporation,

special work, whether considered from the
arising from both these factors cannot fail to
Special Work should be your selection

Over 25 Different Cities Have Installed

Thermit Shop-built Frogs and Crossings

Half of a single-track crossing installed in Omaha, which was constructed by Thermit-welding rails together to form the frogs.

Thermit Outfit Useful for Other Welding Purposes

Everything considered, no street railway can afford to be without one of these useful and inexpensive welding equipments, or deny itself the advantages to be derived from making up its own special work, welding arms to broken mates, welding compromise joints when needed and for repairing broken car truck frames, electric motor cases and for other useful purposes too numerous to be mentioned.

Just think this over. Remember, these crossings are not experimental: the first ones which were made over six years ago are still in good condition and giving the most satisfactory service.

Let us send you a Thermit outfit at once and let our experienced track engineers instruct your men in constructing a Thermit crossing by using simply the rail which you have on hand, your own track labor and the Thermit outfit and materials.

Send for our
latest Rail Welding Pamphlet 3932.

General Offices: 120 Broadway, New York
Pittsburgh Chicago Boston S. San Francisco Toronto

THERMIT

Unless you install the Thermit In
near the maximum life

*Thermit—
the joint that
does not cup*

Metal & Thermit Corporation,

sert weld you will get nowhere out of your city rails

Why?

Simply because the Thermit insert weld is the only practical type of rail connection, whether bolted or welded, which definitely eliminates the break between the rail ends and insures a continuous rail, which absolutely prevents pounding or cupping under heavy traffic.

Prove the above statement to your own satisfaction by inspecting the extensive installations of Thermit Insert Welds in San Antonio, Pittsburgh, Youngstown, Indianapolis, Milwaukee and elsewhere which have been in service for lengthy periods, in some cases about 8 years.

Once you prevent pounding and cupping, you have solved the rail joint problem for good and all because you have enabled the full life of the rail to be obtained. The cost is the primary consideration today in the selection of rail joints as well as that of many other types of equipment, but in order to effect savings it is positively essential that you consider cost in its broad rather than narrow sense by including the factor of *maintenance costs.*

Remember also that cost includes not only the cost of rail renewals, but also the expense and nuisance of tearing up and replacing pavement while making repairs.

The Thermit Insert Weld prevents cupping and thereby proves sooner or later to be the least costly of all methods.

Send for our latest Rail Welding Pamphlet 3932.

General Offices: 120 Broadway, New York

Pittsburgh Chicago Boston S. San Francisco Toronto

How many are

Safety Cars
Standard Cars
Transfer Stations
Buses

It makes no difference what type carrier you are operating, the Shanklin Transfer Machine will certainly accelerate the line of passengers past the conductor or operator.

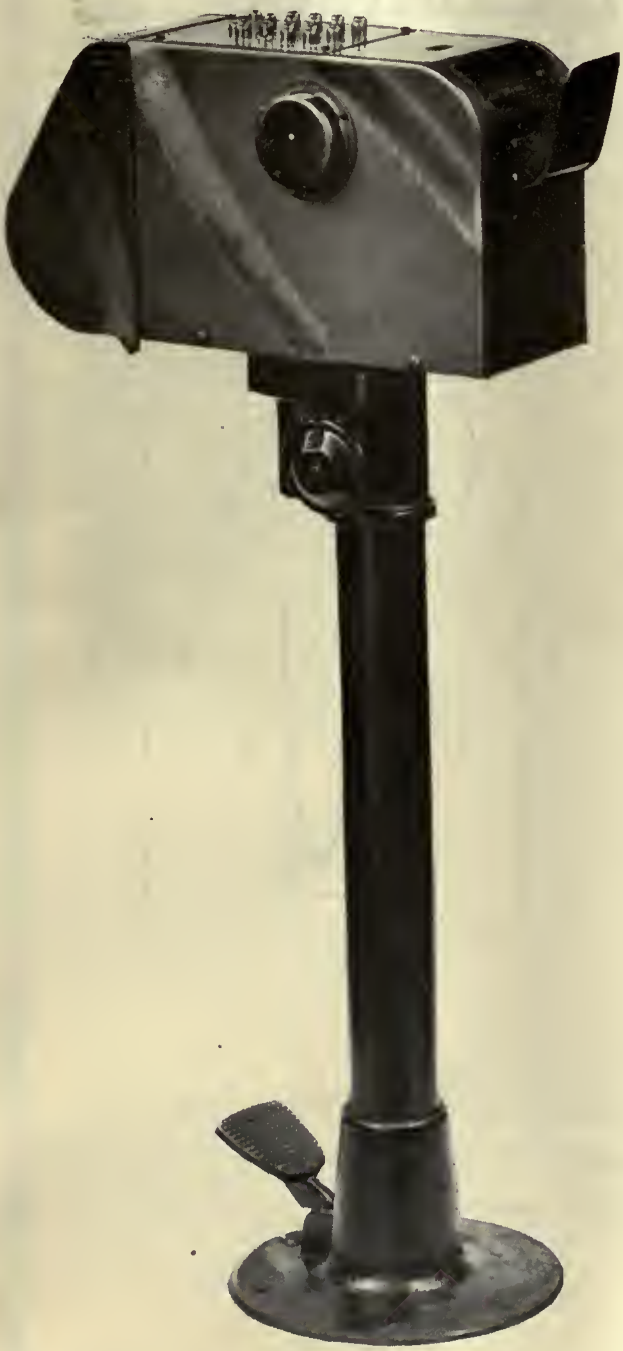
The Shanklin System is being successfully operated in

Springfield, Mass.—Springfield St. Ry. Co.
Terre Haute, Ind.—T. H. Ind. & East'n Trac. Co.
New Brighton, Pa.—Beaver Valley Trac. Co.
Pittsburg & Beaver St. Ry. Co.

SHANKLIN EQUIPMENT

Besse System Bldg.,

asking for transfers?



The traffic cop is giving the operator the highball. But it's no use.

He can't start. Passengers are still climbing aboard.

The traffic cop's whistle blows again and the whole car full of passengers must wait for the current of traffic to shift once more.

This can't happen many times a day if schedules are to be maintained and the good will of your riders secured. You must load the passengers more quickly. If it's the issuing of transfers that's delaying your cars then throw away the slow hand punch and issue the transfers mechanically—at the rate of one a second—with the

SHANKLIN TRANSFER MACHINE

With this machine platform operations are speeded up. Seconds saved at every white pole cut down your running time considerably.

The passenger pays the fare and secures a transfer already waiting for him in the mouth of the machine.

The passenger next in line wants to transfer further down the line. The conductor presses one button which punches the transfer point and intersecting line. A foot pedal automatically punches the month, date, hour, etc., and delivers the transfer all cut to the passenger while the conductor is taking the fare of the next in line.

But there is more than a saving in time. In Springfield, Mass., where Shanklin Transfer Machines have been used for a year on both large prepayment cars and safeties a saving of 40% over pad transfers has been made. There are no wasted transfers as no transfer is punched until it's wanted.

The machine accommodates 500 or 1000 transfers, weighs 21 lbs. and is easily shifted from platform to platform.

Submit us one of your transfers and let us demonstrate how the Shanklin System can save time and money for your company.

COMPANY, INC.
Springfield, Mass.

The Point of Contact

Your passenger and your conductor form a point of contact through which public good will may be gained.

The particular matter which brings the passenger and conductor together is the payment of the fare. When the fare is paid and registered under the Ohmer System, a regular business transaction takes place.

Your conductor is given sufficient authority to act for you with force and intelligence. He is, at the same time, held strictly accountable for results.

The Ohmer System gives him real incentive to serve you faithfully and to develop every opportunity to increase your business through his contact with the public.

Ohmer Fare Register Company
Dayton, Ohio

That "New" Appearance

After They Have Stood for Several Seasons, Bates Poles are Still Erect and Well Poised

THERE is one point about Bates One-Piece Steel Poles that appeals to every railway engineer. That is that they rarely show depreciation. The reason is a simple one; there is nothing about them to depreciate!

Their one-piece construction does away with rivets, joints and welds. There are no pockets nor places in which water, dirt, or injurious material can collect. Unlike the hollow type, they cannot rust on the inside; they are all external *surface*, every inch of which is easily accessible for painting.

The Concrete Foundation Keeps Them in Plumb

The foundation of Bates One-Piece Steel Poles form an interlocking mass of steel and concrete. There is no room for "play." They cannot possibly revolve or be uprooted without destroying the entire bed.

This steady stable base makes for *permanence*. Installed today, it will be unnecessary to bolster up Bates Poles with guy wires ten, twenty, or fifty years hence.

If you want to know more about good poles ask us for a copy of the 1921 Steel Pole Treatise. Yours on request.

Bates Expanded Steel Truss Co.
208 So. La Salle St., Chicago, U. S. A.

BATES ONE PIECE STEEL POLES

TULC 2VH

It has no equal for the Lubrication of

TROLLEY WHEELS
SWITCH GROUPS
CONTROLLERS
ENGINEERS VALVES

It contains neither acid nor filler
It will not harden nor gum
It keeps indefinitely in any climate
It will not freeze in winter
It prevents rust and corrosion

PUT UP IN 5, 10, 25 and 50 POUND CANS—HALF BARRELS—BARRELS

The Universal Lubricating Co.
Offices: Schofield Bldg. Works: Sweeney Ave.
Cleveland, Ohio.

TULC
A
LUBRICANT

—scientifically and accurately compounded to reduce lubricating costs

LIGHTNESS AND SUPREME STRENGTH ELECTRICAL RESISTANCE
NATIONAL FIBRE & INSULATION CO.

PEERLESS INSULATION

A strong, smooth, flexible insulating paper that has shown 25% to 50% greater dielectric strength under severest tests of practical usage.

This electrical resistance together with a higher tensile strength and the properties that make it withstand "baking" more successfully, have given "Peerless" a recognized reputation for efficiency.

Write for the "S-S" Fibre Book for information on "Peerless" and the facts in regard to Super-Seasoned Fibre in sheets, rods, tubes and fibre specialties.

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SUPER-SEASONED
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SALT LAKE CITY
BALTIMORE
HAVANA, CUBA
LONDON, ENGLAND

In CANADA: National Fibre Co. of Canada, Ltd. TORONTO

The Light that Leaps in ONE TEN-MILLIONTH of a Second!

Red Light On
(Green Off)

Light travels 18600 miles in *one second.* The red light of Nichols-Lintern Indicating Signals will say "STOP" across 100 feet of space between one car and the car or truck following *in one ten-millionth of a second!*

The human mind cannot picture this speed—but *your cash ledgers* will show the results of it, in the shape of fewer and fewer claims for damages due to rear end accidents. The fact is, no matter how *closely* your cars run, no matter how speedily trucks or wagons follow on the tracks, the simple red and green lights of N-L Indicating Signals tell *instantly* what the motorman ahead is doing.

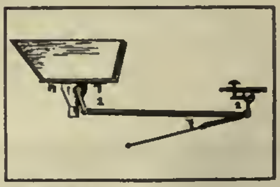
Simultaneously with his every movement, the lights flash "Stop" or "Proceed" or "Half Speed" or "Careful"! The instant the controller handle moves the lights respond. The motorman behind can more safely *coast* (which cuts power costs). And, as he makes fewer false brake movements, there is less wear and tear on motors, brakes and trucks.

Don't let *someone's* excuse be: "I didn't *know* the car ahead was going to stop." N-L Indicating Signals will *tell* with *the speed of light!* Full details on request. Write us.

The Sander that SANDS the Instant you want it to!

A slight foot pressure—and the sand *shoots*—directly on the rails before the wheels—and the car STOPS. No sand is wasted. No *dependence* is placed on AIR. The air brakes may fail—but the N-L Sander *never fails* to deliver so long as there is sand in it.

It doesn't "flood" the track. It just applies enough sand quickly enough—to stop the car. Motormen feel more confidence when they know they are not menaced with failure of air brakes. Mechanical Sanders are an indispensable adjunct just as hand brakes—and we will be glad to send you full details upon request. Write us.



Here is all there is to it for the Safety Car—rapidly and cheaply installed.

The Nichols-Lintern Company

8404 Lorain Avenue, Cleveland, Ohio

QUALITY · SERVICE · ECONOMY · GSO · GALENA-SIGNAL OIL CO.

You cannot tell what oil costs —when you buy it

Lubricating oil is worth just what it gives in lubricating service—and no more. It follows naturally that the oil that delivers 500 lubrication units is worth but half of that which produces 1000 units.

This deduction is as equitable as it is simple. And on this fair basis Galena Electric Car Oil is actually entitled to be rated at double value, by virtue of its proven ability to deliver double the mileage secured from other grades of car oil. Yet the price of Galena is not double—only slightly higher than that of the ordinary grades.

But there is another and even more important argument for the Galena product. The results of mileage tests are quickly apparent—with cheap oil more must be used, and oftener; the extra applications take time and time means money—added cost.

The cost of oil, as compared with cost of equipment, is negligible. Yet poor lubricants have put more good equipment out of business than almost any other cause. It is in time losses, repairs and replacements that the inferior oils take their toll, which, if added to their original cost, would make the price per gallon prohibitive.

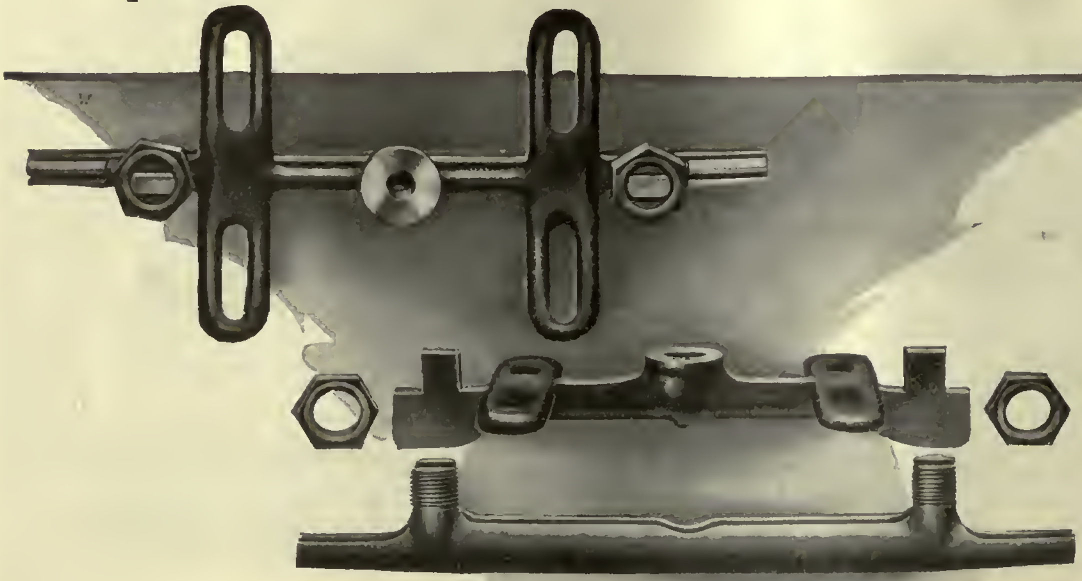
Mechanical men know this to be a fact—experience has taught them. And for this reason—perhaps more than for the obvious argument of mileage—Galena Oils are specified on more than 500 electric properties, for actual dollar and cents economy, as well as efficiency.

QUALITY · SERVICE · ECONOMY · GSO · GALENA OILS

Galena-Signal Oil Company
New York · Franklin, Pa. · Chicago
· and offices in principal cities ·

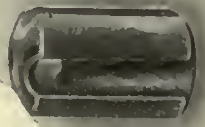
QUALITY · SERVICE · ECONOMY · GSO · GALENA OILS

Strong line material bearing the name of a reliable maker relieves street railways of much trouble and expense

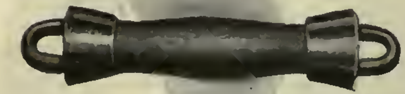


Form S Strain Ear

Moulded Compound Strain Insulator



Solid Porcelain Strain Insulator



Wood Strain Insulator

Big Savings In these little devices

THE strength of G-E Form S Strain Ears is a bulwark for trolley "overhead." But the value of these Ears is not limited to their strength. The shoes are detachable and can be renewed without disconnecting the bodies from the wire. Sherardizing makes their weather-resistance high.

Form S Strain Ears, mounted on the line at intervals to maintain uniform tension and prevent "creeping" are designed so that they cannot pocket a wild trolley. These Ears save money not only on first cost but continuously by their low upkeep.

G-E Strain Insulators of many types—moulded compound, solid porcelain, and wood—are made for every service. For downright worth they are unexcelled.

General Electric Company

General Office
Schenectady, N.Y.

Sales Offices in
all large cities

40-183

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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HARRY L. BROWN, Western Editor N. A. BOWERS, Pacific Coast Editor H. S. KNOWLTON, New England Editor C. W. SQUIER, Associate Editor C. W. STOCKS, Associate Editor
O. J. MACMURRAY, News Editor DONALD F. HINE, Editorial Representative

Volume 58 New York, Saturday, October 8, 1921 *Number* 15

A Spirit of Confidence Manifested at the Convention

LIKE a man rising from the ground after having been beaten down, battered and bruised by some combination of forces which he was powerless to resist, but surprisedly discovering himself whole, with no bones broken and with a tingle of internal energy which tells him that he still has power to conquer any mortal enemy, so the electric railway industry seems to feel its intrinsic soundness and strength necessary to meet today's problems even after the past six years of strife. This, if we have correctly sensed the feeling of the railway men, characterized the spirit of the annual convention of the association this week. The meetings were replete with discussion, all of which gave the impression that the speakers were more confident of ability to cope with the future, that a grasp is already had of many of the vexing situations which have caused so much discussion of late years, and that there is increasing stability in the industry as a whole. This does not minimize, nor indicate any forgetfulness of, the serious present-day problems yet to be solved. Rather it was the manner in which these problems were attacked, the assurance with which they were analyzed and examined, that gave the impression that the industry is more certain of itself than a year ago. Not only in the meetings but in the halls, on the Boardwalk, in all small groups and pairs of friends and acquaintances, one heard and felt optimism and assurance. There were no "rotten business" conversations, but constructive, "the-corner-is-turned," positive discussions of the situation.

With the foregoing as a somewhat figurative background or interpretation of the convention as a whole it is worth while pointing out some of the prominent features and accomplishments. Noticeable on account of their absence, and on account of the reduced attendance directly attributable thereto, were the exhibits of previous years. But there were many remarks that, while the exhibits were of interest and value, their absence this year, when constructive study in the sessions was so desirable, was probably conducive to the best results. At that, an attendance of more than twelve hundred, all present for serious business, was a worthwhile and commendable record.

Salesmanship, recognized as the principal element in the railway business; clean-cut financial reconstruction, and better business methods in general in the railway industry formed the keynote strain of the convention. It permeated most addresses and discussions, no matter on what nominal topic they started.

The group of addresses on finance presented at the Wednesday morning session of the American Association represents one of the really great and constructive pieces of work of the association. While not minimizing in the slightest any other effort at the convention, the address of F. E. Frothingham alone would have made the meeting an outstanding one for its value. This address is presented in full in this report number. It is a sample of the sort of financial leadership the ELECTRIC RAILWAY JOURNAL has called for from time to time; it is in full support of the sort of financial program which President Gadsden has so continuously recommended during his presidency of the association.

Another accomplishment was a clarifying, if not a definition, of the attitude of the industry as to the bus. This is referred to elsewhere in these columns. The strongly supported meeting of publicity men, attended by many leading executives, tended to emphasize the importance of this work and to put it on a higher plane. And finally, though it was one of the first things done, the changes in the constitution which, if carried out in spirit, will mean so much to the association were adopted after full discussion and with the evident wholehearted desire on the part of every one to make the association more useful, more constructive, more virile in its activities.

No one can have attended this year's convention without being encouraged, without having gained an appreciation of the value of the association and its conventions and without having gained confidence in the eventual, if not early, return to complete vitality of the electric railway industry.

The New Administration of the American Association

ROBERT I. TODD, Indianapolis, takes up the reins of the American Electric Railway Association for the ensuing year. A modest, lovable, capable, experienced man, combining in one individual the dual association interests of urban and interurban transportation, he is an executive in whose hands the affairs of this great industry may well be intrusted. His forte is in quietly, carefully planning and executing the tasks confronted. It may therefore be expected that the work done by the association during the next year will be great, though there may be less evidence of it in public expression.

With the president, two of the vice-presidents and six of the twelve members of the executive committee elected at large located in the West, there can be no justification for the assertion this year that the association is run in the East. This is the opportunity for the West to make the association an instrumentality of greater usefulness to the great properties of this section and to shape its activities to reflect more completely the wishes of the entire industry, if there has been any provinciality in its functioning heretofore. It is up to the West, and particularly the Middle West, to make good its administrative opportunity.

Taken as a whole, the new executive committee is an exceptionally strong one and it would be hard to suggest wherein the nominating committee could have improved on its selections. It reflects the careful canvas of the field made and the value of appointing the nominating committee in advance of the convention as provided in the revised constitution.

No Bus Members for the Association

AFTER an extended but very satisfactory discussion of both sides of the proposal to revise the constitution so as to leave it to the discretion of the executive committee to admit bus companies to membership in the American Electric Railway Association the amendment was rejected by a decisive vote. The issue of the discussion was whether well-established, non-competitive bus companies should be taken in so that the association might benefit by their knowledge and experience or whether they should be kept out to avoid any possible distortion of publicity to indicate that the association had recognized or acknowledged that the electric railway was passing and was to be replaced by the automotive vehicle. There was plenty of feeling that to pass the amendment would seriously embarrass some companies in their local situation, and of course such a possibility, seeming real, was to be avoided. The basis for this feeling was the possibility that to recognize the non-competitive, responsible, well-managed bus company would be broadly interpreted in the public mind, perhaps aided by insidious propaganda, to include the irresponsible, unregulated jitney which in many places is seriously jeopardizing the investment in the electric railway and forming obviously unfair competition.

In refusing to admit bus members, however, it should be noted that this action was not in any sense a decision to refuse to recognize the bus as a type of vehicle that may be used profitably and properly by the present members of the association in providing transportation in certain locations or sections of a community, co-ordinating it with the present rail system. In fact, continued and more intensive study of the possibilities of utilizing the motor bus and trolley bus were urged even by those who were most insistent that bus companies should not be admitted to membership. The judgment was clearly that the electric railway companies should openmindedly consider where they can advantageously employ buses, and not that they should take the attitude that the bus as a tool of transportation is one to be scoffed at or ignored. Many of those who spoke on the subject stated concretely that they were now planning to introduce, or had already introduced, the bus for supplementary and complementary service to their present systems. If any vehicle of mass transportation offers a means of more economical service in any location, certainly the present transportation companies should welcome its advent and capitalize its advantages.

Engineers Again Boost Plan for American Committee on Electrification

AMONG the many items of vital interest which marked the second session of the Engineering Association convention none was more significant than the decision to start something in the direction of unity of action in heavy traction investigations. It will not appear invidious if special attention is directed to this matter, because duplication of work in this field on the part of several national associations is already becoming a serious matter. It is none too soon to plan for such co-operation as will insure accurate and complete data in regard to electrification.

The Engineering Association suggests the name "American Committee on Electrification" as an appropriate one for a joint committee representing all interests affected by the electrification of railroads. It is proposed that a joint committee, with this name or some other, be charged for the present simply with the responsibility of collecting and disseminating information with the least possible lost motion. That seems like a very simple proposition. There ought to be no opposition to it. The main trouble is to make a start.

It has been said that "the way to resume is to resume." So the way to have an "American Committee on Electrification" is to appoint an American committee on electrification and to tell it to do something. It does not matter which association starts this movement, just so that one of them does so. It is to be hoped that the executive committee of the Engineering Association will act favorably upon the resolution adopted at the convention, and invite the appropriate executive bodies in other national societies to appoint representatives on a joint committee.

The only possible objection to this plan is that it would add one more to the already many joint committees trying to facilitate progress in this or that direction. This objection is a valid one, but the subject of electrifying the steam railroads of the country is one of such moment and importance that the societies are certainly justified in adding this one to their multifarious activities. The fact is, they are already doing a lot of work along this line, and the purpose of the proposed committee is to reduce, rather than increase, the total amount of work by cutting out lost motion.

Salesmanship Beginning to Be Taken Seriously

ONE of the best products of the 1921 convention was the profound impression made as to the necessity for injecting salesmanship into the conduct of the electric railway business. President Gadsden took the delegates seriously to task for their neglect to take to heart the earnest suggestions made along this line heretofore. He attributed the present straits of the industry to its absolute disregard of the laws of economics and selling applied in every other commercial enterprise the world over. His address and the one by Mr. Goodwin made it pretty clear that for the present at least the problem of salesmanship transcends all others. Both were confident that proper attention to the commercialization of the business will transform the financial condition of the industry, and that failure to do so, particularly in view of the menacing competitive situation, will lead to the financial ruin of the enterprise as a private one.

While several expressions were heard on how to go about securing the proper application of salesmanship all through the business, there was found to be a common belief that the railway president with real sales instinct as one of his characteristics is the ideal man to direct the selling of the company's product. Where a railway is large enough, the officer who is directly in charge of the operating department may well be the man primarily intrusted with merchandising the service. This and the further development of the sales organization of an electric railway are well shown in the chart included in the article by Mr. Goodwin which appeared in the convention issue of the ELECTRIC RAILWAY JOURNAL, Sept. 24, 1921, page 472.

There is no doubt that the sales work must start at the top, including some sales attitude in the directorate as well as the chief executive. The president must infuse the whole organization with the spirit of selling transportation to the public. But he cannot enthuse his staff unless he himself is full of the spirit of salesmanship. For example, if courtesy is an essential of salesmanship, then courtesy must originate with the chief executive. It must permeate down through the organization and reach the car riders from their contact with the platform men. One good point touched on in the discussion of this subject was the recommendation that employees should be kept informed on the many problems confronting the company. They cannot explain to the public unless they are posted. They must understand the goods they have for sale. Mr. Goodwin stated that transportation ought to be the best advertised product in the world because it has hundreds of thousands of potential salesmen coming into daily contact with millions of customers. So it should, and through proper co-ordination the conductor and motorman will so carry out orders as to make more and more friends for the company and thus "put over" the service rendered in a way that should lead not only to good will but to prosperity.

Organization Changes Are Now in Effect

NOW that the proposed changes or revisions of the constitution and by-laws have become a fact, as modified and adopted by the convention, it is well to examine their purpose and probable effect upon the future activity and usefulness of the association.

Most important is the provision for active management of the association's affairs by the executive committee in monthly meetings. This provision, it should be noted, was understood and accepted by those who have consented to serve as officers during the next year, so that the provision will probably be carried out in the full spirit of its intention. This augurs well. It should result in a much higher standard of association activity than when all the responsibility must be shouldered by a secretary necessarily held close to the office, working under the advice of an overloaded president. The provision for the various standing committees is of course important and is a part of the better management machinery which the association has set up. Of course, the most important factor in the operation of the association is the men in charge of its affairs, yet the machinery provided should be made most fitting to assist them in their work.

But there were some matters of association policy originally proposed most of which fell by the wayside at this time, though it was recognized that at some future time action might be different in some cases. Thus, the proposal to change the terms of office of the vice-presidents was not revived, though there had been indication from several individuals that this was considered by them an important point. Transportation companies other than rail will not be admitted to membership, though this had been recommended by the executive committee. The proposal that municipal railways be admitted, made by the reorganization committee but vetoed by the executive committee, was not raised on the floor, and the attitude to be taken toward the individual municipal employee is still undecided. It was apparently the belief of the membership in these various cases that where some of the members thought the adoption of certain new policies might seriously injure them, the association should postpone action until time would develop a more nearly unanimous opinion in favor of the change.

This is undoubtedly for the best. The association will progress most rapidly when all work toward a common purpose with a common policy. At the end of the convention that common purpose and spirit seemed to be strongly in evidence.

Will a New Era Come in New York?

THE proposed reorganization plan of the electric railway systems in New York City offered by the Transit Commission on Sept. 30 is of a constructive nature. The prominent officials in the city administration, which has been hostile to the companies since it assumed office four years ago, claim to see in it an increase in fare to 8 or 10 cents. But this is not justified by any statements in the report, which advisedly declares in favor of a 5-cent fare if that is possible and guarantees that fare for at least a year after the plan goes into effect. It is hoped that before the rate of fare is definitely settled there will be a very careful consideration of the undoubtedly close relation between rates of fare and city planning and development. The principal railway officers have in general refrained from public comment, evidently desiring to know more in detail how the main principles laid down in the report are to be applied concretely.

In fact, the report is an outline only of a proposed plan and its effect on individual companies can be determined only when more information is available as to the way in which it is to be applied. Thus the plan contemplates the taking over of the properties to form the new system on a valuation, but does not explain the basis on which that valuation will be conducted. It also says that railways whose earning power is not sufficient will not be included in the proposed consolidated system. The security holders of those chosen will be awarded 5 per cent bonds up to the value of the property, and a bonus is mentioned as a reward for efficient management, with a barometer fund to determine the rate of fare.

These features show that the plan, broadly speaking, belongs to the service-at-cost class with the addition of an incentive clause, the nature of which is not very clear from the printed report and probably remains to be worked out. The promise is made, however, that those details will be taken up promptly. Hearings are to be conducted and the commission hopes that by next summer the consolidation will be effected and the new system will be functioning.

If the future conclusions of the commission are as wisely reasoned as those in its preliminary report and it has the ability to carry them out promptly the transit situation in New York will be greatly improved.

Every one has realized for a long time that something radical had to be done to bring the present chaotic condition to an end. The surface roads are in a particularly bad condition, especially those with the heavy investment charge of a conduit system. Many are not paying their fixed charges and none can be considered in a prosperous condition. The rapid transit lines are not much better off. The Brooklyn Rapid Transit is in the hands of a receiver, the question of an appointment of one for the Interborough is before the court and the stock of the Manhattan Railway, which under the present lease of that company to the Interborough Rapid Transit pays 7 per cent on par, is selling in the market for about 40.

Such a condition is not good for the companies or for the city. The new plan at least points a way out. It should be developed more fully.

Relation of the Electric Railway Industry to Industrial Efficiency*

By Herbert Hoover

Secretary of Commerce of the United States

Better Understanding of Importance of Electric Railways to the Community and to Industry and Employment Is Necessary in Order to Recover Economic Stability and Develop These Services—Ceaseless Public Education Essential

ONE of the outstanding results of the present unemployment conference has been to impress on every one the unlimited interdependency of our various industries. Not that the general fact was unknown or unexpected, but the conference has brought the fact forward with startling distinctness.

Your industry is no exception to this, but on the contrary is probably one of the most conspicuous examples. It would appear that the only thing which kept you going, as an industry, during some of the past years has been the very necessity of your service in order that the rest of the community could progress and function industrially and socially.

When I speak of "your industry" I mean and visualize the urban and interurban transportation business. For I assume at the outset that, except for the natural desire to protect your reasonable investment in railways as such, you recognize your responsibility to furnish to a community the transportation which is necessary for its development and success irrespective of what physical agency you may deem best to utilize for the purpose.

But, even with the necessity of your service recognized, you are, I understand, in a critical condition, though in a way which differs from the condition of other industries in many respects.

The condition of your industry is indeed critical in many aspects. The whole condition has arisen, at least in part, it seems to me, from a lack of appreciation, both on the part of the general public and on your own part, of the basic interdependence of your industry and the rest of the industries of the community and nation.

Some of the data which bear upon this are astonishing, and are conclusive of the point:

HERBERT HOOVER, SECRETARY OF COMMERCE

Thoroughly immersed in the unemployment conference and daily wearied by an endless chain of interviews on this subject, Mr. Hoover turns aside for a while to devote his attention to the electric railway industry, realizing its important function in the general industrial life of the community. *Copyright, Underwood & Underwood.*

You represent a fixed investment said to be about $6,000,000,000, upon which a great deal of industrial and other business credit is based.

You employ some 300,000 men in normal times.

You burn annually more than 16,000,000 tons of coal.

You have a gross income, estimated for 1920, of some $955,000,000, of which approximately 6 per cent, or nearly $60,000,000, is repaid to the communities in taxes, not to mention the paving maintenance which most of you carry.

You pay out more than $300,000,000 in wages, which is used principally for purchasing commodities and the products of other industries.

You buy directly supply material which costs another $300,000,000.

You buy, in normal times, another $200,000,000 worth for extensions, replacements, etc.

You transport, each year, from 12,000,000,000 to 15,000,000,000 passengers—twelve times as many as the steam railroads.

The very marshaling of these data indicates the close relation your industry has to other industries and its importance to the nation.

There is another element to your service, too, which must not be overlooked, and that is the housing situation—the adequate planning of community life. As you who have developed the industry realize, the only factor which makes possible a healthy expansion of housing facilities beyond the confines of congested city districts is adequate transportation.

I mention all these facts, most of them of every-day knowledge to you, for the purpose of emphasizing the close interdependence of your industry and the industrial life of the community.

The public, on its part, not only must recognize your service in relation to other industries and businesses, but must recognize you as an industry and a business subject to the impact of economic laws that dominate the other industries and businesses.

To be sure, the classification of your business as a public utility has entailed regulation of rates designed to take the place of competition which is in the main theoretically absent, and intelligent regulation realizes the necessity of proper return on actual capital invested if these services are to be extended and satisfactorily maintained.

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*Address delivered at the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 3-6, 1921.

There can be no question but that in the face of rising prices and wages, with at the same time a regulated income, both industry and service have suffered greatly during the past six years; falling prices and wages will of course improve this situation.

Beyond this, however, a better understanding is needed of the interrelation of these factors and of your importance to the community and to industry and employment as a whole if we are to recover economic stability and if these services are to develop.

I know of only one way to a full understanding of these matters—ceaseless public education on the elemental facts.

Put Business Common Sense Into Electric Railway Managing[*]

Thirty-three Years of Economic Errors Emphasize the Need of Instilling the Industry with the Commercial and Financial Instinct—Know the Unit Cost of Your Service—It Is Essential in Making Salesmen of Your Employees

By Philip H. Gadsden

President American Electric Railway Association

IN THE backwash of the great war through which we are now all passing we are conscious, if we think at all, of the movement of a great economic current whose meaning we do not as yet understand and the extent of whose operations we cannot grasp. We know, however, that every business enterprise recognizes the change in economic conditions and every business concern is giving its best thought and attention to changing and modifying the methods of conducting its business in order to adjust itself to these changed economic conditions.

So it is with us. We have been engaged ever since the war in an intensive study of the electric railway situation in this country, in the effort to adjust and modify our methods of transportation in accordance with the lessons drawn from that great struggle.

As I look back on the very short history of the electric railways in this country it seems to me that our whole pathway of thirty-three years has been strewn with economic and business errors. This industry of ours inherited bodily all of the traditions of the horse car. In those early days the entire thought and attention of the pioneers of electric railways in this country were concentrated on the development of the engineering and mechanical problems involved. We were so intent upon developing the electric traction that we entirely overlooked the commercial and the financial problems underlying our great industry.

PHILIP H. GADSDEN

What was the result? Without thought, without consideration, we took over the 5-cent fare without a question, simply because it had been the habit for people to travel on a horse car an average of not over 2 miles for a nickel.

What else could we do? Because the horse cars for that nickel carried people as far as their rails extended, a distance which rarely exceeded 2 or 3 miles, we also agreed to carry our patrons on the same basis for the same nickel, absolutely in violation of all business principles. As I look over the history of business in the world I can recall no other phase of human activity, no one else who had the monumental courage to attempt to conduct an industry like this in defiance of all laws of economics. Is it any wonder we find ourselves where we are?

RAILWAYS A BUSINESS FAILURE

What have we done? In the short space of thirty-three years we have built up a transportation industry which has 44,000 miles of track. It employs over 300,000 people and operates about 80,000 cars, which annually transport many times more passengers than all the steam railroads in this country combined. It is a wonderful achievement, but it is purely from an engineering and a scientific standpoint. From a business standpoint, tested by the rules of common sense and business, we have been a monumental failure.

Now that the haze of the conflict has gone and we are beginning to see the meaning of the struggle we have been through, what lessons shall be drawn? That the future problems of this industry are not engineering, are not scientific, but that the future salvation of the electric railways is in the hands of the commercial men of the industry.

In every business except our own there are two distinct branches. The first is the manufacturing, or production end; the second the commercial, or the sales end. Is there any such division of labor in the electric railways? You will find this commercial development in the steam railroads, in the gas business, in the textile mills and automobile factories. You find it developed in the highest possible character in the electric light and power business. In every line of human activity except ours this well-regulated attention to the commercial and economic ends of the business has been recognized as fundamental. Are we supermen? Can we succeed in defiance to all the laws of political economy? We see the answer in our trial balances tonight.

"TYRANNY OF THE BALANCE SHEET"

As I said on a previous occasion, the hard lesson which we have had to learn and the hard lesson which the public must be taught is that electric railways in this country, while their rates may be regulated by commissions, where other businesses are free to charge what they wish, while its service is dictated to it by a commission, when the service of every other business is governed by economic conditions, while we are hampered on every hand, we still enjoy in common with every other business in the world one privilege, and that is that we live under the tyranny of the balance sheet.

But from now on what I want to impress upon this industry is that the test of a successfully operated property is the same test which is applied to any other business; that is, have you a red or a black figure at the bottom of your balance sheet?

That means that in the future we must put less emphasis on our engineering problems and more and more emphasis on the commercial and financial problems.

What are the problems which are crowding upon us for solution? One is the unbridled and unregulated jitney bus competition, which is eating out our very vitals, while we are chained to the rock of commission regulation. That is a commercial problem which must be met as any other business would which is affected by lawless and unregulated competition.

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[*] Abstract of address presented at the banquet of the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 3-6, 1921.

TAX-EXEMPT SECURITIES

We are faced at Washington with a great problem of taxation. The question of how it is going to be possible for the electric railways in the future to acquire sufficient new capital to provide for the betterments and improvements imperatively demanded by the various communities, of when and how can that capital be secured in competition with tax-exempt securities which are being issued by the millions by our city and state governments, is a problem which will require very grave study. Unless some remedy can be found for that situation of affairs there is no hope of financing this great industry for any extended period. It is up to you to sell to the Congress of the United States the idea that the electric railway is one of the essentials of human life, that here is an industry which lies at the very base of industrial life and is being throttled to death by unwise and impolitic fiscal policy on the part of our government.

In saying these things and in calling them to your attention, if you were the salesmen I wish you were you would go home and do something about it, but you don't. This question of taxing the securities has been fully ventilated and advertised in *Aera* and in ELECTRIC RAILWAY JOURNAL, by facts put there at my request in the hope that each one of you would take it up and sell the idea to your Representative and your Senator. Have you done it? I can answer for you—you have not! If you had been a salesman, if you had had the commercial instinct I am talking to you about, you would have done it. Why didn't you do it? Because you have been trained that service is the one thing to keep your mind on.

We have carried this idea of service to the *n*th degree. I am not at all minimizing the value of good service. I realize that none of these things can be brought about unless we do give good service, but what the electric railway industry is trying to do is to give service even if it cannot afford to give it. Does anybody else do it? No! We have got to change our viewpoint. How will you do it? We here cannot bring it about alone. This is a question of mental attitude, a question of viewpoint, and you must get this idea down through your entire organization and personnel.

ESTABLISH HUMAN RELATIONSHIP

We must as an industry, from the president to the platform man, realize from now on that we are like everybody else. We are not like the Jew in the temple who thanked God he was not like other men. We have been doing that for thirty-three years, thanking God that we did not have to conduct our business like any other business and that we were exempt from the laws of political economy. Now we want to imitate the other fellow who bowed his head in shame and asked that Providence be merciful to him a sinner. We are sinners. We have sinned against the laws of business common sense.

How are you going to get the motorman, conductor and your subordinates into this scheme? We have got to go back to the human relationship which we lost when the industry passed out of the horse-car days. We got so big and employed so many people that the presidents and general managers no longer knew the men on the platforms. We turned that over to somebody else and in that we missed our mark. This job of establishing personal relationship is not to be handed out to a car starter. It's a president's job. It is up to him to enthuse his organization with his own spirit.

One of the prime essentials of salesmanship is that the salesman shall know the value of the goods he is selling. The salesman knows the cost price of his goods, and therefore he is in a position to discuss intelligently with the customer whether the price he is asking is reasonable.

KNOW THE VALUE OF YOUR GOODS

How many men in our organization from the president down know today the value of the goods he sells? We must first have a value placed on our properties, one that the public recognizes and admits. If your motorman, conductor, cashier, collector and every other man in your organization is equipped with this information he has, at least, one of the essentials of salesmanship. He is in a position to say, "The service we are giving to you costs us so many millions of dollars."

A NEW ATTITUDE NECESSARY

I hope I have gone far enough to impress upon your minds what is perfectly clear to mine, namely, that the way out of the difficulties and trials and tribulations which surround us is to have an entire change of heart. We have the habit of laying all of our troubles upon the public. Most of our troubles, most of the abuses which are heaped upon us have been brought on by ourselves. We have invited them; it is our fault that we have a fixed 5-cent fare, not the fault of the public. It is our fault that we carry our riders 20, 30 or 40 miles for a nickel, not the fault of the public. If we tell the public that and admit that we made a mistake, we will have a better chance to preach this new gospel and this new evangel I am talking to you about, for the salvation of this industry depends upon the exercise of the principles of salesmanship.

The Future of Street Railway Financing*

Railways Are a Necessity and Means for Their Financing Should Be Provided—Proper Financial Organization for Service-at-Cost Franchises Is Outlined

By J. K. Newman

Isidore Newman & Sons, Bankers, New Orleans

THERE was a time when municipal ownership was advocated as a solution of the street railway problems, but the cities seem not to want the properties now. Furthermore, the bondholders don't want to foreclose and the equity holders are left with the burden. It is impossible at this time for any street railway to sell even first mortgage bonds, though the issue may be small and better protected than the best standards required in the past. There is no industry which has been hurt more and "hollered" less. The time has come to "holler" loud and continue to "holler" until the truth is known and then to "holler" some more lest the people forget. We have kept our troubles too much to ourselves and the effort to explain the facts has been spasmodic and not continuous.

An organization should be formed and supported by all street railways of the United States to give publicity to the facts. This organization should be organized as a corporation with a complete staff capable of telling the whole story to the public and persistently telling it by every means which seems effective, dignified and businesslike. The trackless trolley car has been shown in moving pictures throughout the country and the effect on the public mind is astonishing in the hope which it has instilled for a cheaper and better transportation. This fallacy must not go unchallenged. The street railway interest should counteract it by the best moving picture story which can be written to show the street railway side, and the picture should be made beautiful to the eye and illuminating to the brain. This is only a trivial suggestion compared to the many substantial things which can be done to counteract the demagogue, the dishonest politician and to educate the men who would really like to know, and, knowing, would be fair.

Municipal ownership would be a blessing to the owners of street railway securities; it may prove far less satisfactory to the public. But the cities won't buy. To their credit it must be said that there are many state commissions and many city authorities who are trying to do the square thing.

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*Abstract of paper presented at annual meeting of American Electric Railway Association, Atlantic City, N. J., Oct. 3-6, 1921.

Unfortunately, however, there are still some city or state authorities who have not the courage to advocate municipal ownership or to give relief by granting higher fares. They falsely fear it means political doom. This is notably and disgracefully true of New York City. But the street railway system is necessary for the life of the city. Hence the city should take over the property at a fair valuation and attempt to operate it in the interest of the people, or allow the owners to do so.

SERVICE-AT-COST FRANCHISES

If the city does not want municipal ownership, it must provide a rate of fare which will yield a fair return on a fair valuation. Many cities have recognized this policy and are adjusting the street railway problem fairly and squarely, but there are some holdouts. Again, argument is used that the street railways will become obsolete. This is an absurdity, not carefully analyzed, but used for the purpose of oppression, and unfortunately it has reached the banker and the investor. If the cities will not buy the street railway systems then service at cost must be granted to the companies. Without some incentive it is contrary to human nature for the management to exhaust its brains and energy on such a proposition. This incentive should be in several forms, as follows: (a) A premium on new capital raised either for extensions or betterments, if it means economy or improved service; (b) a higher return on a fixed valuation when there is a diminishing cost for the service rendered; (c) the right to earn an excess over the fixed return to create a stabilization fund to insure the fixed return continuously. The company should be permitted to invest such excess in property account, but no return should be allowed upon property acquired from such excess. This excess should be large enough to provide for junior financing as hereinafter referred to. (d) The city should recognize the value of expert advice in all branches of its service and permit the cost thereof to be charged as an operating expense. It is often true that a dollar paid for expert advice returns itself many times either in savings or in mistakes avoided. (e) Every effort should be made to reduce the taxes, and the franchise tax should be eliminated altogether.

With a service-at-cost plan in force, the companies must have a financial setup on a modern, comprehensive plan irrespective of what securities may be previously outstanding. Where the companies cannot comply with a standard or modern form of financing, they should find a way out even if they must resort to receivership to readjust the capitalization.

If properties under the service-at-cost plan are to be allowed only an 8 per cent return, the requirement that net earnings after deducting renewal and replacement charges shall show twice the interest on bonds outstanding would limit the outstanding bonds to 50 per cent of the value of the property, assuming that the bonds had to be sold on an 8 per cent basis. That, however, would leave too large a proportion of the cost of additions to be financed by junior securities. Therefore with the modern treatment of renewals and replacements, the bankers must recognize the fact that adequate provision for renewals and replacements protects the bondholders to the same extent as a corresponding surplus over bond interest did in the past when such provision was not made for renewals and replacements. The bondholders will be properly safeguarded in this particular if it is required that the net earnings when added to the renewal and replacement reserve set aside out of earnings shall aggregate twice the interest charge. In this case, such renewal and replacement reserve should be inviolably dedicated to renewals and no portion of such reserve should be available for dividends. Assuming such renewal and replacement charges to amount annually to 3 per cent of the recognized fair valuation, this would permit the issuance of 8 per cent bonds to the extent of about 70 per cent of the cost of the additions and still show twice the interest charges in net earnings and provisions for renewals.

SALE OF JUNIOR SECURITIES

With such a requirement from investment bankers, no street railway company should have first mortgage bonds outstanding in excess of 70 per cent of its valuation. The issue also should be unlimited in amount so that additional bonds can be issued from time to time without limiting the total amount ever to be outstanding, but restricted as to the conditions under which additional bonds may be issued. Under such a plan only 70 per cent of the money can be raised on first mortgage bonds, even after a financial reorganization has occurred either through voluntary process or receivership. How is the additional 30 per cent to be raised? It might come through any one or all of the following sources: (a) The company should be allowed to earn an excess over the fixed return to be invested in additional property as hereinbefore explained. (b) The cities must give such support to the companies that preferred stock can be sold to the patrons of the company. The city should lend its effort to insure stability of principal and continuity of dividends on this preferred stock by removing all obstacles in the way of profitable operation. This means the city should indorse one and only one system of transportation, thus enabling a monopoly, if you want to call it by this name, but a monopoly which never grows fat and lives on a mere skeleton diet. (c) When the preferred stock has thus been sold to the patrons of the company and where the first mortgage bonds outstanding are less than 70 per cent of the valuation a second mortgage issue will be safe and will appeal to certain classes of investors who need a larger return than is obtainable on absolutely first mortgage bonds. (d) Sale of common stock. Where the income return allowed by the regulatory bodies is sufficient to cover the average interest rate at which all the company's securities are sold, it will ordinarily be the case that the interest paid upon the first mortgage bonds or other prior lien securities is materially less than the average rate of return. Thus, the surplus net earnings available for the common stock will be materially in excess of the average rate. This should make it possible to sell common stock at par or better to such investors as are willing, in consideration of such increased income, to assume the larger risks of business going with the junior securities.

When the city authorities or state commissions have fixed a fair value on the property and have determined what is a fair return thereon, it is no longer their affair how the company capitalizes so long as the capitalization is such that additional securities can be sold to meet the cost of improvements and additions in the future. For instance, if a company had a valuation of $1,000,000 and was allowed an 8 per cent return thereon and if it could sell at par 6 per cent first mortgage bonds for 50 per cent of the cost of the property, the remaining 50 per cent would be capitalized in the form of common stock and the surplus available therefor would be 10 per cent. The higher yield on the common stock might make junior financing possible, and no interference should be offered by the city if the common stock should show 10 or even 12 per cent return, provided the total return on all securities did not exceed the fair return allowed on the agreed valuation. If the city and state authorities will learn this lesson it will be an important step forward in the financing of junior equities, and thus make street railway financing more feasible.

FRANCHISES AND INDETERMINATE PERMITS

There is nothing more destructive to street railway financing than short term franchises unless it is short term franchises which undertake to make rules, regulations and general conditions of operation in the distant future. Bankers will not recommend and investors will not buy bonds where the maturity thereof is beyond the maturity of the franchise. It is expensive to refund an issue of bonds, and no one advocates that street railway bonds should or could be paid at maturity without refunding. It makes a tremendous difference whether an issue runs for one hundred years or if it is refunded ten times during that period.

If first mortgage bonds on street railways were limited to a fair per cent of the fair value of the property and were properly protected by maintenance, renewal and replacement clauses and the many other good clauses which the usual mortgage now contains there would be no need for a maturity under one hundred years or more and no sinking fund would be required. However, there are many objectionable conditions which have crept into these mortgages and they must be eliminated, while on the other hand several new clauses should be inserted through which the conditions can be changed to meet conditions which will arise in the future. It would probably be hard at the beginning to have a condition in the mortgages that 50 per cent of the holders of the bonds issued could change practically any or all of the conditions of the mortgage, but if the street railway companies and the bankers will confer from time to time a broader understanding of proper financing will result and mortgages will be devised which will strengthen the companies instead of restricting them to the point where reorganizations are necessary.

The indeterminate franchise is necessary for proper rehabilitation of street railway financing. Such a permit should be exclusive; it should allow the fare to be flexible; it should insure against jitneys and buses which parallel; it should permit ample regulation, but regulation which will not confiscate. A co-operative effort should be made to get all states to adopt a fairly uniform indeterminate permit law. Progress has already been made in this direction, but strenuous efforts are necessary to make this theory a universal practice.

The Basis of Financial Recuperation*

Recognition of Fair Valuation as a Basis of Capitalization by the Railways and Recognition of Fair Rate of Return by the Public Are Necessary—A Simple Financial Structure, with Holding Companies the Exception, Is Also Good Policy

By Francis E. Frothingham

Vice-President Coffin & Burr, Inc., Boston, Mass.

OUT of the welter of discussion over the difficulties of our street railways, probably the nearest to a common opinion is that the street railway cannot be dispensed with in the larger communities and in their more densely populated tributary territory except by a dislocation of community habits and values not to be contemplated. Confidence that the industry is a permanent one will sooner or later beget success in restablishing it on a sound footing—but only, I am afraid, at the expense of much heart-burning and many losses.

In what I have to say I will not undertake to discuss any of the physical problems, interesting as they are, but will touch only on some of the more conspicuous general ones as they present themselves to the lender of money.

In the first place, it seems to me that the street railway business has not yet emerged from the cloud of public condemnation of past practices, and until this cloud has rolled by no just solution of the difficulties of the industry is possible. It is profitless to rake up the unpleasant past of overcapitalization, mismanagement and political corruption with which the history of the business is unfortunately too replete, unless it serves as a guide in the present. There is no way of allaying this lurking feeling of maltreatment except by persistent candor and patience on the part of the companies. Another handicap to developing local good feeling is, in many instances, the fact of foreign ownership or of distant control by absentee holding companies. The arguments in favor of the holding company are recognized, but I feel confident that in this particular the disadvantages of remote, I had almost said unsympathetic, banker control, in the case of the larger properties at any rate, outweigh the advantages. Absentee landlordism is bad in practice where it can be avoided and a community instinctively resents this sort of dictation in its affairs and not improperly demands a home discussion and solution of local needs. Surely such an interpretation of public hostility gives it a reasonableness that makes it curable.

GOOD WILL ENGENDERS FAIR PLAY

With public sympathly and good will once developed the instinctive human habit of fair play will surely be effective in securing for the struggling companies a fair return on a fair valuation, and more than this they have no right either to ask or expect. That is a very easy thing to say, but as the slang expression has it, "you have said a mouthful." But once this principle is established the problem becomes one of detail, however slow or harassing its solution may be. Cleveland, Dallas, Boston, to name a few conspicuous examples, are making different applications of ways and means to this general principle, and each is securing varying measures of success.

The search for a fair valuation means inevitably the abandonment of many preconceived ideas and a readiness to recognize the fact that existing capitalization is a factor in the search only in so far as it may help to show how much money has actually and legitimately gone into the service of the public. The public demands to know the amount of investment which is reasonably used and useful in its service, and it is increasingly apparent that any effort on the part of the companies to divert the search for that figure will but delay the reconstruction process. It is hopeless and unreasonable to expect support of capitalization which stands only for speculative anticipations, and the sooner the justice of this basic demand of the public is recognized will a great impediment to reconstruction be removed.

FAIR RETURN MUST BE ACCORDED

Search for the fair return on this fair value demands the recognition by the public of the fact that the cost of the commodity which the street railway sells varies as does the cost of any other commcdity which it buys and which it expects to fluctuate from time to time. The 5-cent limitation which operators in the past gladly accepted because it seemed then so abundant has prejudiced the companies' case most unfortunately. The public mind should be cultivated to accept a cost of service, as it works out under varying operating conditions, as the fair commodity price, and it surely will when its confidence in the operators is restored and the necessities of its own best interests are fully realized. In other words, where a community is protected from selfish management by commission jurisdiction there need and should be no limitation on the rate of fare required to cover operating expenses, reserves for depreciation and cushion funds, and the agreed upon fair return on the fair valuation. No one can foresee the varying cost of operation, and a fixed limit either high or low in the fares which may be charged is both practically and theoretically a menace to continuity of credit and so to adequate public service, which depends on the existence of such credit. The Boston Elevated now charges a 10-cent fare and the public accepts it as a matter of course, having confidence in the disinterested and intelligent administration of the public board appointed by the Governor under the recent enabling legislation in Massachusetts.

In this connection the war was a ruthless teacher. Suddenly and conspicuously it made all the inherent and slumbering street railway difficulties loom large and destructive—the danger of motor-car competition, the inadequacy of provisions for depreciation, the vital menace of mounting costs of material and labor against a fixed cost of product. The war made the industry totter and left some ruins, but it showed up all the worst that there was to know, so that the salvaging efforts can now be concentrated on that which is worth saving.

THE PROBLEM OF THE BUS

In the jitney and bus service the street railways have been subjected to a very severe type of competition. They have had competition before, but usually in kind. This is a new kind of trackless enemy and the danger was, I think, very unhappily met, perhaps because of a certain tendency of un-progressiveness in the industry which in the past has made many advances in physical equipment and operating practices wait around, so to speak, for recognition. When the jitney came, the industry unfortunately only decried it as an unfair competitor. The effort was rather to eliminate it on the plea of unfairness than to insist upon its being made a fair competitor. Little or no effort was made to absorb the new agency and to co-ordinate to the public gain the trackless innovation with the tracked system. Thus public opposition was aroused when instead public sympathy and help might have been secured. I am aware that as yet, except on Fifth Avenue, that vertibrate avenue in a long densely populated island, that Arnold Bennett called the finest avenue in the world, there is no demonstrated success in jitney-bus service. Its potentialities are such, however, that it should be co-ordinated with the street railway service and competition, if such there must be, kept at the respectful distance that stimulates but does not kill.

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*Address presented at the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 3-6, 1921.

It is even open to discussion whether competition will secure the best rounded and most effective public service. Entire absorption of this new agency by the street railway has much to recommend it, if the companies would agree to put on such service where and when the utility commissions, after hearing, have found a need for it. The public has a clear right to the benefit of advanced practices, and any effort to deprive it of them will only prove a boomerang. Possibly trolley wires may still be used where it is too expensive to maintain the tracks under them, for of course the problem is with the trackless vehicle in general, and not the gasoline-propelled vehicle alone. If there must be competition it is absolutely important and fair that vehicles using the streets for the collection of fares shall equitably bear the costs of street improvement and maintenance. No jitney can permanently expect or should have free use of that portion of a street which a street railway company has built and in winter keeps clear of snow.

FRANCHISES—A QUESTION OF MEN

This brings us to the question of franchises, which have such a direct bearing on the dependability of a fair rate of return. A terminable grant under rigid conditions has no satisfactory basis for financial credit. The indeterminate permit coupled with some form of service at cost, with flexibility of rate adjustment, and the right of a municipality to purchase at an agreed-upon valuation, is the most encouraging type of grant so far developed. The monopoly feature and the equalization of street costs as just discussed are also very important.

Of course the human element in the administration of any type of franchise must always make its effectiveness more or less uncertain, for the administration of any plan can either make or break it, but that does not detract from the necessity for working toward such terms in a public grant as fundamentally seem the fairest and the soundest in principle. Those elements which inject selfish interest and opportunity for manipulation should be eliminated. In the long run it ought to be possible to find good men to do a good job for a fair wage, if their tenure of office is dependent only on the merit of their work. But these considerations only bring us back to the perpetual question of the right men. Just now, for instance, able men of high character are administering the Boston Elevated, under the enabling act referred to, most hopefully. Substitute a board of political henchmen and there will follow disaster under the identical act. So also with the new administration of the old Bay State Street Railway, where remarkable practical results are now being achieved with a very extensive urban and interurban mileage.

Public ownership and operation with its contaminating political influence under our form of government (and experiments in public ownership in Europe are chiefly danger signals) holds no prospect of improvement over private operation and should be turned to only in the event of outright failure of private effort under fair treatment. Should public ownership and operation be resorted to, the only hope of decent service lies in control by a long-time board beyond the reach of political influences. The present management of the Boston Elevated is a compromise plan being watched with much interest. But, as I see it, the burden of private ownership is to make a clear demonstration that it can meet the call upon it, and my personal belief is that it can win out in this effort if it will. But it must be prompt and energetic and ready to take losses in the process.

Recovery of credit also rests on some solution of the labor problem. If company and men can find no way of living together in peace, not by fits and starts, but continuously, money will be hard to find for capital expenditures. Cessation of operations and destruction of property breeds nothing but distrust of the business. The interest of all hands, public, employer and employee, demands a strenuous effort to devise some scheme of compromising differences without either strike or lockout. All three groups should rest their case for final decision and acceptance with some board of arbitration. Possibly the Philadelphia experiments may point a way. Some form of collective bargaining is of course essential, but the basic principle to be recognized is that no group of men in a public service has a moral right either to quit work or to lock out at its arbitrary pleasure, merely because it harbors a grievance, and so tie up a public service.

It is so easy to say these things and so difficult to find a way through that one feels almost ashamed to make what must sound like futilely trite remarks to you who are laboring so hard in the field, while I among others seemingly only look on and say, bring us this thing on a silver platter and then we will help. But it is really not as bad as that on the banker's side. The banker does not buy to hold, he buys to sell, and he can only resell what his customers will buy. He must pass his purchase along, and he cannot do that to people who see street railways shut down over a franchise fight, or because of jitney competition, or of a strike or lockout, or who do not find net earnings coming through for return on their money.

The investor in street railways has been brought up to believe that it was a cash business payable in advance, that it needed little working capital, that the riding habit steadily increased, that he could see all the property and judge for himself if it was well maintained. So he bought and got hurt—and now wants the reasons why corrected before he lends again. All we can do is to keep on correcting the faults till his confidence is restored—and he wants, not unnaturally, an overfull measure of correction. So the industry must keep hammering away—and all I am trying to do is to emphasize some of the salient points at which the hammering must be concentrated, as we who must get the funds from the doubting public see it.

A SIMPLE, DIRECT FINANCIAL PLAN IS A FIRST ESSENTIAL

Looming large in the background of the present dark-colored picture is the financial plan, through which the direct appeal to the public for funds is made. Here, to my mind, three very important essentials stand out. A capitalization should be simple, it should be direct, and it should bear as nearly as possible a unit relationship to valuation. The financial structure should be as scientifically developed and adapted to the special case as is the physical structure to its environment and the service that is expected of it. Too frequently has it been a case of money needed somehow, and any available security marketed, until an almost unintelligible financial conglomerate has resulted. Sometimes the conglomerate has grown out of painstaking but mistaken effort. But however developed, these complicated financial structures should as rapidly as possible be abandoned, even if suffering comes to former investors. A piece of physical property is scrapped in the stride forward, but herculean efforts are made to save a financial plan equally faulty or outgrown. The desire to save innocent investors from loss is rightfully ever present, but it is a mistaken sense of justice to continue raising money on a plan that only multiplies the ultimate victims. The public utility runs on indefinitely, and the greatest good of the greatest number may demand a drastic course. That financial reorganization will be brought about on an extended scale to insure success is inevitable.

By a simple plan I mean, say, such a one as has raised money for the Detroit Edison Company through all sorts of market vagaries for years, and is still good, *i.e.*, bonds directly secured by physical property, and common stock also secured by real values. Paying a good dividend as it does, money can be raised on this common stock in ordinary times and the bonds are always in the background, salable for lower-priced money or when stock money is not obtainable. The Commonwealth Edison Company also follows this simple plan with conspicuous success. Bonds and common stock, as nearly fifty-fifty as possible, is the simple, effective, sound plan. To refer to the Detroit case again, the company, in order to maintain the desirable relation of bonds to stock, issues debentures from time to time, convertible into common stock. Up to the strain of the war these debenture issues had been converted practically 100 per cent, so maintaining the essential bond-common stock basis. Some such simple plan should be the goal of every utility, as an aid to stand the storm of changing conditions.

I have deliberately deferred the mention of preferred stock, because I am inclined to feel that it is a security whose usefulness is perhaps overestimated. It is the intermediate security between the indenture-secured bond, with its right of foreclosure and non-participation in management, and common stock. It has a lien on earnings ahead of common stock dividends, and so makes an intermediate appeal in raising funds. Its use still leaves the financial plan very simple, but I think its very prevalent use is closely associated with the fact that as a rule too much of the needed funds have been raised on funded debt, and so sufficient margins have not been left to put common stock on a substantial dividend basis and so to make it a dependable financial medium.

Of course the increasing sale of any stocks tends, if the voting power is attached, as in my judgment it always should be, to distribute ownership, and there is often fear lest this process will divert control from a particular quarter. Control of the public services, however, should be allowed to go where it will and management should depend on the competence of its service for its retention. Fear of loss of control again arouses public suspicion, which is quieted the more nearly a given community owns or has the clear opportunity to own and manage its local services.

Here again the war comes in with its lessons. Its strain brought many situations to their knees because bond rates were limited in so many cases to 5 per cent or only a long-time bond was issuable, and no company could afford to sell them. So resort was had to bond-secured notes and every ingenuity of financial device. But the lesson was this: just as the service at cost plan depends on unlimited fare fluctuations to meet changing costs, so deeds of trust must provide for interest rates and maturities and other features such as call figures, tax provisions, etc., as will from time to time best meet changing or emergency market conditions. It will take great care to develop in deeds of trust offering these flexibilities the substantive features of security and equality of lien unimpaired, without which a bond becomes such in name only. It can and should be done, however. Similar flexibilities can also be applied to preferred stocks to advantage, while retaining equality of rank. Efforts have recently been made in both these directions and they are not only advantageous in themselves, but bring the great advantages of simplicity of capitalization within easier reach.

WEAKNESS OF HOLDING COMPANY FINANCING

Direct capitalization and the holding company security come into immediate conflict. The holding company security, supported by the pledge of the direct obligations of several operating properties, contains a diversity factor strength which has been strongly argued, and for certain purposes and in particular instances has its advantages. It is a fact that during the war the holding company in some cases facilitated the raising of money, but on the other hand there were many cases when the inter-relationship of indirect ownerships made a way out almost impossible. But as a permanent means of satisfactorily financing the important street railway companies of the country, it is difficult to find justification for it. It is fraught with possibilities of grave abuses, and for that reason and because the holding company is not subject to commission control it leads to strong local distrust and criticism. Then, too, its securities, in the case of the large property, are as a rule not so salable as the direct obligation of the operating company itself, provided the capitalization has a simple structure. In the case of smaller properties the benefits of the holding company are of course often many and real, and are locally appreciated, but there can be no doubt of the soundness of the practice of selling to the public the direct obligation of the larger operating properties themselves.

Over-capitalization still exists with many of our street railway systems. This fact, I think, cannot be gainsaid, and where it obtains cannot be set aside as irrelevant. I am afraid a great deal of effort will be yet wasted in attempts to preserve an unjustifiable set up in the hope that chance and returning general prosperity and the continued growth of the country will still take up the slack. These will in all probability be destructive rather than constructive efforts. It will be much better to make opportunity out of the present difficulty to get started right. It is often argued that the fixing of a fair return on a fair valuation reduces the amount of capitalization to relative unimportance, because the allowed return will go only so far as it will. If there is not enough to reach common stock dividends, for instance, they merely will not be paid. Non-readjustment of capitalization in such cases distorts the idea of real value and the conception of the proper relation between securities of different classes, and maintains public suspicion.

The man in the street will not let up his fight against a capitalization that bears no reasonable relation to valuation. The principle of an aggregate par value of securities to equal valuation must sooner or later be accepted, and the sooner the better. Massachusetts has been much laughed at in the past for its rigid capitalization statutes, yet the properties in the state have continued to grow, and now when the public good will means everything in the street railway struggle, the knowledge that everybody has, that capitalization equals valuation by the operation of law and public control over many years, and that the par of bonds does not exceed the par of stock outstanding, takes from public opposition to remedial legislation one of its great complaints.

It is hard to be drastic, but these are drastic days. Street railway financing today is almost non-existent. During the past year scarcely a dozen purely street railway companies in the United States have raised any money by the sale of securities, and even so each case has been in some way special. This condition cannot continue long and the street railway business as a private business survive.

There is no Moses to lead the industry out of the wilderness. There is no panacea for its ills. Each case is special unto itself and must be laboriously worked out. But a background of sound general principles remain and the more closely these can be followed, the sooner, I feel sure, will the credit of the street railway industry be restored. Credit canot be re-established without earning capacity and earning capacity cannot be achieved in the face of public distrust and opposition, the hydra-headed enemy of the industry.

Claims Association Elects Officers

AT THE FINAL meeting of the American Electric Railway Claims Association, the following officers were elected for the ensuing year:

President, C. G. Rice, superintendent claim department Pittsburgh Railways.

First vice-president, Wallace Muir, claim agent Kentucky Traction & Terminal Company, Lexington, Kentucky.

Second vice-president, W. H. Hyland, claim agent Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y.

Third vice-president, Howard D. Briggs, assistant general claim agent Public Service Railway, Newark, N. J.

Secretary-treasurer, E. L. Lindemuth, claim agent Wilkes-Barre (Pa.) Railway.

Executive committee: G. B. Proctor, claim agent Memphis (Tenn.) Street Railway; W. G. Fitzpatrick, general claim attorney Detroit United Railway; T. B. Donnelly, claim agent West Penn Railways, Pittsburgh, Pa.; S. J. Harrell, claim agent Knoxville Railway & Light Company, Knoxville, Tenn.

Service-at-Cost Contract Franchise and State Regulation*

The Relative Merit of Each Depends Largely on Makeup of Public Bodies Involved, but with a Good Board, Service-at-Cost Contract Franchise Has Manifest Advantages

By Edward Dana

General Manager Boston Elevated Railway, Boston, Mass.

STATE regulation has generally come to signify control through a state commission, of service to be rendered and rates charged therefor, and further a nearly absolute power over capital issues, whether of stocks, bonds or long-term notes. The fundamental feature of this plan and its greatest weakness is that it looks at only one side of the financial structure of the company, to wit, its receipts. It has no direct connection with or responsibility for expenditures. The commission suffers no loss and incurs no public odium if its decisions result in financial catastrophe for the company affected.

Service-at-cost franchises have taken several forms. Since I am associated with a company under one of these forms which was previously subject to state regulation, and can speak as to that from personal experience, I will take its features as the ones to be considered. Here we have a state board, just as in public regulation, but that commission is given absolute control over and responsibility for both sides of the ledger. It determines the service, prescribes the rates of fare and dictates the expenditures to be made. It is under a duty to see that receipts are sufficient to provide for operating expenses, meet interest on indebtedness and pay certain fixed dividends upon stock—and the state guarantees that its commission will accomplish this result. If the rates it establishes do not provide the necessary funds, the taxpayer in the district served through the state must make up the difference.

There are advantages and disadvantages in each of these plans of control. From the point of view of the stockholders in times of rising costs the advantages of service-at-cost are apparent. With receipts practically fixed and expenditures increasing, there is apt to come a time when dividends cease and even bond interest cannot be met. In such a time the service-at-cost stockholder is in a comfortable position. The return on his investment, while not large, is secure.

Theoretically, public regulation should not and need not impair the return to the stockholder. The United States Constitution protects an investor in public service corporations in a fair return on his investment so far as state interference is concerned, and it is as much the sworn duty of public service commissioners as of a court to recognize this. Given a regulatory board, conscientious in its sense of duty to the investor as well as to the public and of sufficient courage, increases of fares would not lag behind the condition which made them necessary. Nevertheless, even with an ideal commission there will be, in periods of rising costs, a certain length of time between the moment when increased fares are necessary and the time when they can be put into effect. Evidence must be collected to prove that the increase is necessary, and this cannot well be done until the time of need has arrived. Public hearings must be had and delays of greater or less extent are sure to occur. Throughout this time of waiting a loss is being suffered, which with costs still rising is not likely ever to be made up, but, rather, goes on repeating itself.

EDWARD DANA

Under our service-at-cost plan what the public does not pay in carfare it must make up in taxes. The tribunal controlling the fares is responsible for seeing that they produce enough revenue to meet the costs. It is in a position to act quickly and has the incentive for so doing. Accordingly, not only is the stockholder in better position, but the property has a better chance to be completely self-supporting.

In a falling market the position of the stockholder is reversed. The same sag between changes in carfares and financial condition which warrant them is almost certain to occur and tends to be more pronounced. In the falling market this time of sag between the decreased cost of operation and decrease in carfare furnishes an opportunity for profit to the stockholder and of increased dividends. I said the length of this sag was apt to be greater if anything. It is more difficult for outsiders to present evidence to a commission that carfares should be reduced than for a company, in possession of all the facts, to prove that they should be increased. Delays from litigation are apt to be longer, and the same opportunity for delay, which on a rising market may spell receivership for the company, now works to the advantage of the stockholder. The same thing would be true in a period of development in the industry when rapid improvements, new inventions or changed methods of operation reduced net costs even though general costs were increasing.

If, during the last twenty years, the purchasing power of the dollar had been steadily increasing instead of decreasing, we would probably not have heard much agitation over service at cost. Owners of properties would have preferred the speculative chance of making a profit over the security of a moderate but fixed return on capital. but so long as the value of the dollar is on the decline, I believe the advantages to the owners are in general the other way.

ADVANTAGES TO THE MANAGER

From the point of view of the operating manager, there are many advantages in our service-at-cost plan.

A regulatory commission cannot acquire the knowledge and understanding of the properties, needs and possibilities of a particular system that can be acquired by persons active in its management. The regulatory commission is apt to think that things which may appear desirable can be done without undue burden, although the commission does not know how. It is apt to take the position that the management can and will find a way if it is ordered to do so. It is apt to be suspicious of an honest exposition of a case because some other company has put something over in times past.

With service-at-cost, the public board of control is just as much, in fact more, interested in whether a suggested rerouting of cars, additional transfer privilege or construction of a new line is a sound business proposition as is the operating manager. Furthermore, as this board selects its manager, it naturally has confidence in him. If he does not merit such confidence, he ceases to be manager.

Operation under such a plan is therefore simpler than under a regulatory commission. Less time is wasted in unnecessary hearings on fantastic suggestions or ill-founded complaints. Changes in routings, time tables, transfers or rates of fare can be made when needed, instead of being made when permitted.

At the beginning of the third trustees' year in Boston, after a full year's operation on the 10-cent fare, operating costs faced a substantial increase due to a $3.56 increase in the price of coal and an advance of 16⅔ per cent in wages made by an arbitration board. It was estimated that by the end of the year this increase would amount to $3,000,000. The public board in control at once faced the situation. The manager was enabled to act immediately and institute economies so that the actual increase amounted to only $353,336.44.

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*Abstract of paper presented at the convention of the American Electric Railway Transportation & Traffic Association, Atlantic City, N. J., Oct. 3-6, 1921.

The efforts made to rearrange the service quickly, curtailing where possible without impairment of the service, resulted as follows:

52,000 less tons of coal were burned.

837 less accidents occurred.

817,299 less miles were operated.

757 less men each week on the payroll.

That this was not done by sacrificing the property is indicated by the fact that there was

31 per cent reduction in defective rolling stock.

23 miles of track were rebuilt or repaved.

113 new cars were added to the rolling stock.

$2,000,000 allowed for depreciation.

Four districts of local 5-cent fares established.

13,189,620 more revenue passengers transported.

No public hearings were caused and no hostile newspaper attacks made.

DEFICIT CHANGED TO SURPLUS

A unified and concentrated control of management resulted in men and management attacking the problem courageously and the car rider seemed to realize that it was his problem which was being solved. A deficit of $1,457,415.82 was changed to a surplus of $131,985.01 in nine months without sacrificing maintenance or proper allowance for depreciation and with no increase in carfare.

It is my opinion that, had such a situation existed under private management and state regulation, much of the management's time would have been required at public hearings listening to abuse and preparing elaborate defenses, instead of accomplishing the job of efficient and economical management to meet existing conditions of increased costs and arbitration awards, and that no decision would have been rendered in time to meet the situation.

NO ILLS FROM PUBLIC OPERATION

It is apparent that, during the period of operation referred to, the ills frequently said to accompany public operation did not exist under this plan. Some of these may be cited, such as the invariable increase in employees, the drop in morale and efficiency, camouflaged accounting, cost put on taxpayers to secure popular support through low rates, withdrawal of values from taxation. The payroll employees have been on a strictly business basis, the morale and co-operation of the force never better, the accounting exactly as prescribed and used by all street railways, the fare self-supporting, and cost not assessed on taxpayers, the amount paid in taxes greater in amount than previously, but on the same basis.

What I have just said is all based on the assumption of a board of control composed of able, honest, zealous men. If such a board were made the football of politics, composed of politicians holding the position merely for what each personally could get out of it, little of what I have said on this score would be true.

In such a case a manager might be ordered to put unnecessary men to work, to operate service when and where it was not needed, to do divers things, inefficient, wasteful and contrary to his sound judgment, and when the day of reckoning came find his reputation as a manager sacrificed for the political ambition of his board. From the manager's viewpoint, I should say that given an equally good board I would prefer the service-at-cost plan, but with an equally bad board, public regulation. The bad regulatory board could not do so much harm in so short a time.

ADVANTAGES TO PUBLIC OF EACH PLAN

What are the advantages of either plan to the public at large?

The answer must be much the same as from the manager's point of view, although the type of person who appears at hearings of public commissions, as self-styled representatives of the public, would probably not agree. That gentleman styles every increase in carfare as an outrage and robbery, every rush-hour train as cattle cars, and universal transfer as divine right.

In the long run it is better for the public to have its utilities operated efficiently with a fair return to the investor than to be carried for a time at a carfare too low or in a manner too elegant to pay costs. Any savings made by efficient management in the long run benefit the public, either by direct improvement in service or reduction in carfare. I believe that in Boston a great majority of the people accept this view. Increases in carfare from 5 to 7 to 8 to 10 cents within a period of twelve months were accepted with so little objection as to be negligible. In my opinion this was due to confidence in the personnel of the board of trustees and the realization that the management was conducted in the interest of the public, and that money paid in carfares only went to meet necessary costs and not to the advantage of private investors.

MAKEUP OF BOARD DECIDING FACTOR

From what I have said, you will gather that in my opinion the relative advantages of these two systems depend largely on the makeup of the public boards involved.

The Massachusetts plan attempts to insure the presence of a good board by providing a term of office of ten years. A long tenure gives the value of experience and the intimate knowledge acquired from year to year. It furnishes incentive to efficient management because any mistakes made, whether intentional or unintentional, are pretty sure to come home to roost before the term of office of the men responsible for them has elapsed. There is time in which to demonstrate ability, to disclose incompetency or dishonesty. It seems to me that the chance of having a board of the desired standard is much greater under such a plan than with the regulatory commission.

Men who would not be willing to serve on a regulatory commission because of the limited nature of its authority and the lengthy hearings to be attended are willing to give their time to a public service where they may really do things of benefit to their community and which they may view with just pride. The field of the regulatory board is limited to a wise, semi-judicial restriction of others. It is a highly important and honorable position. The service-at-cost board has the opportunity for large achievements and the satisfaction which comes from the accomplishing results, however great the obstacles. It is this joy in playing the game which keeps many a wealthy man in business after he has amassed all the wealth he can desire. This element in human nature will always assist in maintaining a high standard of capacity in a board managing for the public such a service as this in a large community. The larger the problem, the higher the caliber of men who will be willing to attack it, although the money compensation be little or nothing.

One other subject should be touched upon, "The financing of the company or raising new capital."

Any system in a growing community is constantly in need of capital for extensions and improvements. As the community spreads, lines must be extended and power plant enlarged. As it increases in population, more cars must be run.

Our experience with respect to new capital has not yet been encouraging. Investors have not as yet drawn the distinction between the condition of our company and that of the railways in general. It was thought at the time the Massachusetts act was passed that the guarantee of dividends would make the raising of capital easy, but a 6 per cent stock at par is not marketable and as yet we have not reached that maximum rate and since the present plan is only ten years' duration there is not the certainty which a gilt-edged bond possesses.

Under private management there is practically always some financial group in control which is interested in seeing that the company is properly financed. Under service-at-cost this assistance is lacking.

It remains to be seen whether, when the money market is more nearly normal and street railway securities are in better favor, the certainty of fixed return of the Massachusetts plan will compensate for the loss of speculative possibilities and the loss of financial backing of strong concerns.

Street railway investments have been hit so hard of late years that there is little market for anything that bears that label.

The operation of a street railway system is much before the public eye and the personnel is constantly in touch with the public at large. Such an organization cannot produce its best work if it is the football of the daily news, its management always defending itself before hearings, etc. No business can prosper when every one is operating it, much less a business on a fixed return with as small a margin as exists between income and outgo of a street railway.

Indeterminate Franchise Indorsed*

By R. I. Todd

President Terre Haute, Indianapolis & Eastern Traction Company

R. I. TODD

ONE of the most striking epigrams in Mr. Dana's paper is contained in the next to the last paragraph, *i.e.*, "You cannot regulate one-half of an industry with success." This terse statement presents in a nutshell one of the fundamental difficulties which practically all public utilities have been forced to operate under and which seems to be so little appreciated by the general public, or even by the majority of the best-informed business men. The public authorities who regulate the receipts of public utility corporations should also be held responsible for their operating expenses and net earnings so far as this is reasonably possible. The plan suggested by Mr. Dana, under which the Boston Elevated Railway system is now operating, seems to combine, in a most advantageous way, the control by public authorities of both the income and outgo of the company. Outside of the State of Massachusetts, however, no public utility operator has been able to convince the lawmakers that the operating deficit of a utility should be charged against the tax duplicate of the property owners, and even in Massachusetts, if I am correctly informed, the Boston Elevated Railway practically enjoys a monopoly of this most valuable feature of the service-at-cost legislation. In the Middle West it would be extremely difficult to get any legislation of this kind placed on the statute books.

With possibly the single exception of Massachusetts, the two most generally considered plans of utility control and of operation seem to be the service-at-cost plan and the indeterminate permit method of operation. Under the latter plan, in theory at least, a utility is practically assured by the State that it will be permitted to earn a reasonable return on all property used and useful for the public, but that the chance of speculative profit is practically given up.

The particularly advantageous feature of some of the so-called service-at-cost franchises is an automatic rate of fare, dependent solely upon the receipts and operating expenses of the company. When an increase in rates of fare with an indeterminate franchise becomes necessary, relief is usually not granted until the company has been seriously affected financially, and if further relief is required usually there is considerable additional delay.

However, outside of this advantage of an automatic fare adjustment, there are many disadvantageous features to service-at-cost franchises. One of these is the lack of incentive to the company to operate as efficiently and economically as under an ordinary franchise. Even the provision by which a greater rate of return is permitted to the company as rates are lowered does not thus far seem to have resulted in securing low rates of fare. A second objection is the extreme difficulty of securing a wage scale which is fair to the public, the utility company and the employees alike. Where unreasonable demands are made for increased wages and the fallacious argument is used that to grant them merely means the adding of half a cent or a cent to the fare, the company officials are placed in a disadvantageous position, and arbitrators in many cases grant an increased rate or make less of a proposed decrease in rates, where the expense is simply passed on to the public.

While no one will claim that an indeterminate permit plan is a complete solution of the franchise problem, of all the plans which have become effective it seems in general to be the most advantageous. Under this plan the rates of fare as well as the rates of return are directly under the control of the Public Service Commission, and the theory of operation is that as long as the corporation gives efficient and satisfactory service its franchise continues indefinitely and the state guarantees a fair rate of return on the money invested, or an investor can sell his stock or bonds to some other person at approximately the price which he paid for it. This form of permit also gives to the cities and towns what might be termed "home rule" for existing utilities, to the extent that they may pass any reasonable rules as to the quality of service to be furnished, with the direct right of appeal at all times to the courts.

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*Abstract of discussion on Mr. Dana's paper presented at the annual convention of the American Electric Railway Association, Atlantic City, Oct. 4, 1921.

Contrasted Advantages of Service-at-Cost Contract Franchises and State Regulation*

By S. B. Way

Vice-President Milwaukee Electric Railway & Light Company

S. B. WAY

THE purpose of regulation is to safeguard the public interest by securing good service at lowest cost. To fix standards which will insure good service and at the same time avoid waste requires the services of men experienced in the industry, possessing good judgment and removed from local political influence. State regulation makes possible the continuous employment by the state of the necessary high-grade, experienced specialists at not much, if any, in excess of the cost of the same service if procured singly by any individual municipality. Moreover, such people if employed by the state are less likely to be subject to local political influence than people depending upon local favor for their jobs.

State regulation, however, as practiced up to the present time has not been made automatic. Under present procedure it is necessary for the utility to establish a long record of inadequate earnings or even absolute insolvency before relief can be had. The framers of our laws might just as well have made a complete job by definitely requiring the commissions to function in limited time or even to establish automatic rates.

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*Abstract of discussion on Mr. Dana's paper, presented at the annual convention of the American Electric Railway Association, Atlantic City, Oct. 4, 1921.

Service-at-cost contracts are nominally automatic. As developed up to the present time they appear to have been conceived along rather too narrow lines. In some cases proper provision has not been made for future replacement of physical property or the conservation of the investment at the termination of the service-at-cost contract or a determinate franchise. They have not provided for necessary flexibility in rate of return to meet changing money market conditions. Unless these elements can be satisfactorily covered, such contracts are likely to result ultimately in service being given at less than cost.

State regulation being statewide can, of course, and in fact does, attempt to meet the problem of regulating utilities serving more than one municipality. This problem is particularly acute in the railway business, where poorly paying suburban lines serving communities contiguous to but beyond the corporate limits of the city must be supported by the city service. It would be difficult to negotiate a fair service-at-cost contract with a city which would recognize and compensate for the losses on lines serving suburbs from which the city receives no benefits in taxes, increase of population, etc. Theoretically this situation can be met with special legislation by some form of district organization, but such special governmental subdivisions appear to be more closely related to some form of public ownership and operation than to service-at-cost contracts which must depend upon obtaining a fair trade between privately owned utilities and the municipalities served.

Where state regulation is possible, the legal and economic advantages seem to lie with properly conceived and executed state regulation, while the political advantage seems to be with local service-at-cost contract franchises. Under such contracts the service may cease to be a political football, and definite bases can be established for promoting desirable co-operation on the part of the city in regulating street traffic, economical routing of cars, paving, saving needless litigations, and like matters.

Some attempt has been made under various forms of regulation to provide an incentive for privately owned and operated utilities to achieve maximum efficiency. Generally the plan adopted is not sufficiently comprehensive or is based upon negative rather than positive considerations. No examples are at hand of service-at-cost contracts embodying provisions for rewarding both the capital and labor employed in the industry for improved efficiency, as compared with some standard. No form of regulation will be wholly successful in producing the best service at the lowest cost which ignores the principle of a definite reward for unusual effort. Both service-at-cost contracts and state regulation offer ample opportunity for incorporating in their respective schemes adequate provision for inducing and rewarding the best service on the part of labor and rewarding capital for foresight and efficiency in management.

It is doubtful if there is any one solution or formula generally applicable as a cure for the present ills of our industry. It is certain there are great differences in local conditions, and each problem must receive special study and treatment.

Car Purchases May Be Financed Through Car Trusts*

S. M. CURWEN

One Car Company Alone Has Taken 3,000 Notes in Varying Amounts—No Defaults Have Been Made

By Samuel M. Curwen

President of the J. G. Brill Company, Philadelphia, Pa.

MANUFACTURERS, as public spirited citizens, interested in civic affairs as well as in the need of transportation for their employees, should take a real interest in transportation matters in their respective localities and assist regulating bodies and railway managements in many ways which would tend toward more satisfactory transportation conditions. I believe if this were done many of the misunderstandings arising between the management of electric railways and the authorities in the community in which they operate would be obviated.

It has been suggested that it would be entirely proper in this paper to refer to the question of financing purchases of electric equipments and cars, as this phase of the industry also shows the interest of manufacturers in the electric railways.

In 1919 it became apparent that it would be difficult for railways requiring equipment, which they were unable to get during the war, to finance the purchase of it through the issue of bonds or the regular channels by which money heretofore had been available.

A plan was therefore devised for leasing cars under the car trust plan, not only to large roads, but to the small roads as well. The manufacturers of electric cars and their equipment found that bankers could be interested in the purchase of car trust securities and in their resale by them to the public even covering equipments for small roads if they could be offered in large enough amounts. Under this plan there was to be deposited a number of small groups of car trust obligations with a trust company as trustee, enabling the trustee to issue coupon certificates of interest against these purchasing company's notes held by them. These certificates of interest were issued in series from time to time and sold to bankers in Philadelphia, Chicago and Baltimore.

Thus the cars are leased to the railway company under an agreement providing for the payment of a certain cash rental upon shipment and for deferred rental represented by the notes or lease warrants of the railway company. The cash rental and the deferred rental represent the purchase price of the cars plus the interest on the deferred rental payments. The title to the cars is retained in the vendor or lessor and the lease or agreement is recorded in the proper office as prescribed by the specific statutes of the respective states. Nearly all the states now have special statutes providing for such conditional sales of railway equipment.

The agreements contain the provision that upon payment of all the lease warrants and covenants provided for in the agreement the title to the cars shall automatically vest in the railway company prior to which the title remains in the vendor.

This plan for the purchase of cars has been found very convenient by many electric railways, and the payments have been so arranged that the lease warrants mature monthly in small amounts, comparatively speaking, over a period of from thirty-six to sixty months, thereby enabling the railways to make their payments from increased earnings and economies derived from the use of new equipment, especially safety cars, of which large numbers have been sold on this plan.

This method of financing proved so satisfactory, both to the purchasers and to the manufacturers, that it seemed advisable to organize a financing company which would be larger in its scope than the method first used. With this in view, early in this year, a company known as the "Electric Railway Equipment Securities Corporation" was formed by the General Electric, Westinghouse and Brill companies, having a capital of $1,000,000. The purpose of this company is to buy from the manufacturer lease warrants or car-trust notes taken by the said manufacturer from the railway in payment for the sale of their equipment. When a sufficient amount of these lease warrants accumulate they are deposited by the Electric Railway Equipment Securities Corporation with a trustee and the trustee issues against these lease warrants certificates of interest with coupons attached which are sold to bankers for distribution to the public. The certificates bear the guarantee of the Electric Railway Equipment Securities Corporation, covering the payment of principal and interest. This form of security is readily salable to investors.

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*Abstract of paper presented at the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 3-6, 1921.

This same method of selling cars has been carried on by one or two other car manufacturers in a manner I think entirely satisfactory to them, and to their bankers and customers.

The Brill Company alone has sold over one thousand cars on this plan, and has taken from the purchasers in the various transactions, covering the sale of these cars, more than three thousand notes or lease warrants of varying amounts. Many of these purchasers now practically own their cars and have been able to pay for them out of increased earnings, in this way requiring no long-time financing. I think it is a proud record for the railways to have attained when I say that of all the thousands of notes given no default has been made making it necessary for the trustee to repossess the cars. The manufacturers make no profit from this financing transaction, which clearly indicates their interest in the present electric railway crisis.

Terminal Service Possibilities of the Electric Railways*

The Opportunities of the Electric Roads to Supplement the Services of the Steam Trunk Lines in Freight Terminal Service Are Set Forth

By J. Rowland Bibbins

Manager Department of Transportation and Communication, Chamber of Commerce of the United States

HAVE electric railways exhausted their earning power? From a national viewpoint this question must recur continually to the mind of every one sincerely interested in the great business of transportation. The answer seems today to encompass the hopes and fears of the entire industry, to the perfection of which so much energy and capital have been given during the last three decades. But have all the possibilities within our grasp been uncovered? Has development work come to its climax? And if so, what of the future?

The history of transportation development is a romance perhaps only half told, the story largely winding itself about strong personalities and to a large degree illustrating the theory of the "survival of the fittest." Systems have come and gone—toll roads, stage coaches, horse-drawn canal boats, the Mississippi River packet, the American clipper, railroads of hybrid gages, cable cars, storage battery cars, surface contact systems, etc.

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J. R. BIBBINS

Each new agency has developed its own peculiar service possibilities and operating methods. The economic acid test of all has been the ultimate ability of the industry to stand squarely on its own feet and perpetuate itself automatically through external and internal development. And the whole tendency of this development over the long period has been better and more service per unit of revenue, higher speed, improved efficiency and equipment, more stable employment of capital, greater dependence of the public upon the service rendered and a higher order of utilization of the operating man power. Shall this same acid test be applied in the future or have we a more refined formula?

The strangest aspect of this transport development is that the electric railways costing about $3 per dollar of annual gross revenue have confined themselves to passenger business alone, while steam railroads have reduced their costs to only $2.80 per dollar of revenue by developing both passenger and freight. On the steam railroads freight revenue is normally three times passenger revenue; it is only a negligible fraction of the gross revenue of the electric railways. The steam lines are available for practically continuous traffic; the electric lines are used to only one-fourth of their investment and capacity, lying idle during most of the twenty-four hours. It is a fair question whether this situation is either sensible or economic.

CITY DISTRIBUTION AND TERMINALS

Outside of the main-line mileage, steam railroads have perhaps half of their investment in terminals, sidings, yards and other trans-shipping facilities. These terminals are necessary in every city, large or small, and occupy widespread city areas of high land values, yet they have been acquired only by the mightiest efforts, at huge expense, and often under conditions of most bitter competition. The entire city terminal problem is today the most serious one confronting the nation's transportation systems, requiring the utmost co-operative effort to unravel. Electric lines have a large responsibility in this matter. They gridiron the entire areas of our cities and industrial centers in a manner utterly impossible for the steam lines. They have the same gage, with few exceptions; they intersect the steam lines at a thousand places; their roadbeds are usually more substantial; they reach every industry, very many of which are inaccessible to the steam lines except through long trucking hauls from the freight terminals. They reach literally millions of retailers whose enormous tonnage, in and out, moves likewise over the city streets.

The next question is one of what is best for the city. What is the cheapest, the quickest, the most convenient and the least unsightly method of transporting over our city streets from the railroad terminals perhaps 200,000,000 to 300,000,000 tons per year? Shall it be in combination with the broad network of electric railways already established in the cities and only used to one-quarter advantage? Will not future civic efficiency and welfare greatly depend upon the solution worked out for city terminal transport?

Very few American cities have downtown streets of adequate width and capacity for present needs, to say nothing of future needs. Sixty-five foot streets, more or less, are the rule, which width provides for only one line of vehicle traffic in each direction between car tracks and side parking. Nevertheless, general business in our large active cities is growing at such a rate as to double in eight to thirteen years, and the service of business largely centers around finance and transportation, both freight and passenger. How are we going to transport double the present traffic volume of our cities? Already the question has become so acute that a definite movement is on foot to develop future indutrial centers in widely distributed and relatively uncongested town units of small size. This means that the economic burden of the big city has become too great a drag on business and occasions too great a spread between basic production cost and selling price.

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*Abstract of paper presented at the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 3-6, 1921.

CO-ORDINATION—WHAT DOES IT MEAN

We talk glibly of conservation—making the best use of what we have, and developing our resources to their utmost. Quite as glibly we talk of "coordination of transportation facilities"—finding the best field for each agency, making them work together instead of at cross purposes, yet how little real co-ordination has been accomplished in the transportation field even during the war when the utmost team work was imperative.

It seems to me that a good chance to start this team work is in putting the electric railways—urban, interurban and rapid transit—to further use as terminal transport agencies, interchanging traffic in the most intimate fashion with the steam railroads and using motor transport for the final operation of delivery where direct delivery cannot be made as efficiently. This great city railway network should transport during off-peak hours much of the tonnage that now occupies the city streets in a vast multiplied fleet of unregulated, unstandardized, unorganized, and more or less unsuited vehicles, which vehicles contribute perhaps the majority of the congestion of which they themselves complain and which undeniably makes adequate passenger transportation of the cities' millions a difficult and in some cases an impossible problem. This is not alone a matter of corporate profit, but one of civic necessity—to make city life more endurable under growing traffic. This relief would automatically come through the consolidation of the tonnage into large units of rolling stock. The electric system could be used to best advantage between main downtown and outlying substations, the final delivery to be made more readily by lighter delivery motors.

At first there will be many difficulties to be overcome—trans-shipment facilities, routes, regulations, rolling stock, track gages in a few cases, franchise legislation and especially the opposition of railroads, trucking companies and a hostile public. Nevertheless, the true economic test should, and I believe will, ultimately prevail. The cost of extra handling might be very greatly reduced by the use of multiple-compartment cars loading directly at the railroad freight houses, moving to the substation and thence, without breaking bulk, by motor to the consignee, where large volume scheduled service is required. The problem of suitable rolling stock can be worked out by means of well-built, sightly express cars, which have been already developed on some interurban systems. These cars when well maintained should be no more unsightly or noisy nor contribute to congestion more than the miscellaneous fleet of motor vehicles now used at all times of the day in the same service over our city streets. In several cities it is already the practice to utilize the tracks in certain streets for hauling standard steam rolling stock from interchange or local yard to city destination. What is now needed is a more thorough development of the plant. The railroads are working on a "store-door delivery" plan, such as has been in use in Canada and England and formerly in Baltimore and Washington. If a universal store-door delivery plan is in fact developed which disregards the 45,000 miles of electric street railway track as an economic factor it will be unfortunate.

The greatest hope in such a co-ordinated plan of railroad-railway-motor terminal transport is the ultimate benefit to the whole people. Through consolidated loading the street congestion will be reduced. By the more intensive use of tracks already laid the investment will be put to more economic usage. Duplication in carrier equipment will be avoided. For the road vehicles the expensive delays and time-eating long hauls will be done away with and converted into faster short-haul runs and greater earning power. Roadways will be cleared for a better use of passenger transport, and a good part of the enormous city freight business will be done largely under cover.

But most important, the new economy will be clean cut. For the electric lines there would result new revenue, now utterly unobtainable, at no additional cost to the city or to the public, and little to the carriers. For the city there would result a large decrease in wear and tear on city streets; for the people, in addition to the improved service and the possibility of reduced delivery expenses, there would be the possibility of a relief from the necessity of boosting passenger fares; the new revenue from freight and express should become such an important factor in the total revenue as to bring about not only relief from the pressure for increased fares, but also the possibility of improved passenger service. It is needless to point out the important influence of such increased revenue upon the financial credit of the electric railway industry.

Considerations Affecting the Market for Street Railway Securities*

Customer Ownership of Securities Should Be Encouraged—Modern Experience in Public Utility Financing Should Be Studied by Railways—Tax Exempt Securities Impede Financial Progress

By H. M. Addinsell

Harris, Forbes & Company, Chairman Public Utility Securities Committee, Investment Bankers' Association of America

A FEW weeks ago we were asked to consider the purchase of a substantial amount of bonds, the proceeds of which were to be used for the reconstruction of one of the French cities shattered during the war. The bonds were to be a direct, and the only, obligation of the city. It probably received about as continuous unfavorable financial publicity in the four years of the war as any city in the world has ever received. It was an almost constant mark for German shells, its industries were destroyed, a large proportion of its dwellings and many of its historical edifices were damaged, some of them hopelessly beyond repair. But a reconstructed and probably better and more sanitary city is arising, phoenix-like, on the ashes of the old city. The economic reason for the permanent existence of an important city at this point is unquestioned and from an intrinsic point of view there is probably little doubt that the bond issue referred to will make a perfectly safe investment. However, to be an attractive proposition to investment bankers a bond issue has to be not only safe but also salable.

The very mention of the name of the city arouses our sympathies, but by that same token it does not arouse a desire to loan funds to that city on an investment basis. If our sympathies were strong enough and our pocketbook permitted we would be glad to make a contribution toward its reconstruction as a charitable act, but these people do not want charity. After careful consideration we reluctantly came to the conclusion that the American market would not take these securities at this time on an investment basis; that is, on any reasonable terms that the city could afford to meet, and we were obliged to decline the business.

There is at least some parallel between the position of the French city referred to coming into this market for money and that of our own street railways at the present time.

If we are to deal constructively with the situation that confronts us we must face frankly the facts of that situation. One of the facts is a strong, definite and not unfounded prejudice in the minds of investors against street railway securities at the present time. I refer to the investing public as a class, for the situation intrinsically and fundamentally is not nearly so bad as the impression that has been created in the public mind. Those who really know the facts know that the answer to the constantly recurring question in investment circles, "Can street railways come back," is an affirmative one—they can, they will, and they are already on their way.

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*Abstract of address presented at the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 3-6, 1921.

We can base our discussion on the proposition that the street railway, as the Federal Electric Railways Commission notes, is "the most nearly adequate, reliable and satisfactory system available for transporting the maximum number of people through the streets of our cities with the least interference with the use of the streets for other purposes of public ways." Perhaps there may be isolated cases, especially in very small communities, where motor buses will serve the purpose, but we have already had a practical illustration of the essential nature of the street railway transportation in at least one large city.

If we are correct in our assumption that the street service is an essential and indispensable part of the machinery for conducting the business of a substantial community, we find there are still many other considerations that affect the market for the securities of the street railway companies. Already I have referred to the recent past history. In addition to the rise in costs, which precipitated the troubles in the immediate past, are a number of other conditions—franchise troubles, franchise abuses, honest and dishonest politicians, topheavy capitalizations, the jitney bus. Generally speaking, a given community has the idea that the street railway is a foreign corporation; that is, it is owned by outside capital, and generally speaking it is correct in that view. Of course in the last analysis the public owns the street railways as it does all the other utilities, and whether or not it realizes it it has a direct or indirect financial interest in the success of these enterprises. The most positive cure for the impression above referred to lies in the sale of stocks of these companies to the local public served; in other words, changing the status of the public from that of *customer only* to that of *customer owner*. This has perhaps not been possible in the past because of the difficulty of making attractive stock issues of the street railways.

A note of warning should be sounded in connection with sales of stocks to customers and employees. The customer should not be asked to pay more than the general market for the class of security offered him. The stock should be sold on a complete statement of the facts and weak securities should not be gilded over with generalities. Moral consideration should preclude these practices, but if indulged in the inevitable reaction will be disastrous to the future development of this important means of supplementary finance.

I have spoken of some points with which all of you are familiar and regarding which you all know a great deal more than I do. The elimination of the prejudice of investors against street railway bonds will take time and can only be accomplished by a persistent and thorough educational campaign on the part of your companies. You have nothing to hide, and if you had there would be no use in trying to hide it. The most you can expect and all you are entitled to receive is a fair deal from the point of view of the money legitimately invested in your enterprises. This you are entitled to, and enlightened self-interest on the part of the public will eventually result in your getting it. It is up to you to do the enlightening. You must demonstrate to the public that the service-at-cost franchise will make it possible for it to get the best service at the lowest cost and will give you a fair return on the money invested in your business.

New money cannot be attracted to your enterprises without a reasonably certain prospect of its receiving a fair return. Such service-at-cost franchise should provide among other things for some reasonable premium on good and efficient management. Motor bus competition must be eliminated and the paving of streets recognized as a municipal function and not as a burden to be imposed on the street railways. Capitalization should be set up on sound and conservative financial principles. These things will take time and patience and they must be done in the open. Try to get the public served as financial partners in the enterprises, but at least make them partners to the extent of sharing your knowledge of the facts. These are merely signposts pointing the way in general to the restoration of street railway credit.

HOW TAXES AFFECT FINANCING

To these specific considerations with respect to the street railway industry, however, should be added another general consideration that applies to the raising of money by all private corporations in the United States. By private corporations I mean all the corporations other than those representing the state, city or other governmental subdivisions. For the purpose of this discussion I shall call the latter governmental corporations. These governmental corporations since the advent of the income tax have enjoyed an unwarranted advantage over the private corporations in the matter of raising money for carrying on their business. I refer to the fact that, generally speaking, the bonds of governmental corporations are exempt from all federal income taxes. The bonds of private corporations are not inherently exempt from any of these taxes, although by private contract a corporation sometimes agrees to pay the normal federal income tax up to a certain small percentage, but this is merely a private contract, and taxes so paid come out of the corporation and are such a small percentage of the total—they cannot exceed 4 per cent of the normal income tax of 8 per cent, disregarding the surtax entirely—that it does not come anywhere near curing the disparity between tax free and taxable securities.

Before the days of the federal income taxes there was about one point difference in yield between average good municipal bonds and average good public utility bonds, but today this is nearly 2 per cent, not because the difference in security has changed, but because, among other things, tax exemption of the governmental securities gives them a very decided artificial advantage, damming up the large reservoirs of capital from these corporations and, from the broader economic point of view, depriving the government of millions of dollars of taxes that it can ill afford to lose and from those who can best afford to pay. Of course there are many sides to this broad question and in the last analysis of course it must be recognized that it is not the exemption, *per se*, of governmental securities that has helped to make it difficult for private corporations to finance, but the confiscatory levels reached in taxing income and which could only be justified as a war emergency measure. That the government recognizes this fact is evidenced by the tax legislation now pending in Washington which will reduce the top rate normal and surtaxes to 40 per cent. If this can be followed by further reductions in the next two years so that the rates more nearly conform to the pre-war level the situation will readjust itself without regard to the United States constitutional amendment referred to.

PRESENT FINANCING DEVELOPMENTS

On talking some days ago with Mr. Mortimer, I told him that I didn't suppose you gentlemen would be especially interested in a discussion of modern developments in public utility financing, as you probably knew all about it. He pointed out that it was so long since the street railways had been able to do any financing that it would be practically a new subject, so I will take him at his word. The series mortgage and the no par value stock are the two outstanding recent developments along the lines of progress. The series mortgage gives flexibility from the point of view of enabling the company to issue its prime security with a maturity and an interest rate to meet existing market conditions. If conditions are such that short term, high rate obligations are the most salable they can be created, or if longer term, lower rate bonds can be sold to advantage they can be created, all having the equal security under the same mortgage.

An equal degree of flexibility to meet varying market conditions is afforded to stock financing by having the stocks issued with no par value. Assuming, for example, that a stock calls for an annual dividend of $6 a share and the market for that class of security calls for 7 per cent, the stock could be under a "no par value" law at 85½ so as to net 7 per cent and thus meet the market, or if in the same case stock could be sold on a 5 per cent basis the price would be 120. This may sound very simple and easy, but of course a condition precedent to the sale of stock is the creation of values and earning capacity for such stock. This in many cases in your industry is neither simple nor easy; in some cases it will involve, among other things, financial reorganization.

In order to sell stocks you must create an investment position for them. This will necessitate in many cases a scaling down of capitalization, both bonds and stocks, so as to make your stocks represent actual investment in the property. No par value stock laws will not cure overcapitalization, for the units represented by no par value stocks of an overcapitalized company would represent such a small amount that they would not be readily salable. So the stocks must be brought down to a basis where the units thereof do represent a reasonable amount of investment upon which you will be entitled to earn a return. Then the stocks will be salable, and the bonds ahead of them even more salable. No prudent investment banker today will buy bonds of a company that has not a good practical vehicle for accomplishing its junior financing.

A public utility property cannot stand still; it must expand to meet the growing demand for extensions and service that is inevitable in our American cities. Though you may have ever so sound a bond situation theoretically, and perhaps only be able to issue your future bonds for, say, 75 per cent of the cost of future capital expenditures, if the means for providing the other 25 per cent is not in hand, then you and the investment banker who handles your bonds are headed for certain trouble. A good plan is to have two classes of stocks, preferred and common, then you have three strings to your financial bow—common stock, preferred stock and bonds.

I do not offer you any quack cures for your troubles. We all know the facts and we know that the situation intrinsically is not as bad as advertised. Do the right sort of high-class advertising to offset the bad advertising you have had. Take the public fully into your confidence and work to get your financial houses in order—by a major operation if necessary. Make the public you serve your partners. Above all, push on with this work, confident and determined to give to the American public the best kind of street railway service that is obtainable at the lowest practicable cost and to preserve for the owners the billions of dollars honestly invested in your great industry. To bring your companies from the clouds of uncertainty and depression to the sunny skies of merited prosperity is surely an undertaking worth while and one worthy of the steel of strong and courageous men.

The Underwriters' Laboratories and Its Work*

G. B. MULDAUR

Inspection of Devices with Respect to Fire Hazard Involved in Their Use Is the Function of This Organization, Founded in 1893 and Incorporated Twenty Years Ago

By George B. Muldaur

General Agent Underwriters' Laboratories, New York.

WE ARE destroying by fire alone every year $500,000,000 worth of property. This is exclusive of the cost of fire protection and insurance. We are having about fifteen hundred fires a day, or nearly one a minute. The United States Geological Survey has estimated that the amount of property destroyed in one year is equivalent to all the gold, silver, copper and petroleum produced during an equal time. Our per capita loss by fire is by far the greatest in the world. These statements are made simply to lay stress upon the value of any movement tending to decrease this waste of life and property and to lead up to a description of the activities of Underwriters' Laboratories, the technical member of the group of national organizations devoted to this important work.

Underwriters' Laboratories is unique in its organization, purpose and methods. Founded in 1893 by W. H. Merrill, its present president, it has built up in its twenty-eight years of life an unquestionable reputation for accuracy and integrity as the recognized authority on matters pertaining to all devices, appliances, machines and materials in respect to fire and life hazards, theft and accident prevention. In 1901 it was incorporated under the auspices of the National Board of Fire Underwriters, whose financial backing enabled the management to secure proper buildings, equipment and staff and to lay out a plan of action which has made it self-supporting.

The purpose of the laboratories is to diminish the enormous fire and accident loss by indicating those materials, apparatus, construction and installations representing practicable standards of excellence. Devices submitted to the laboratories for listing are first tested by the engineers in charge. If they attain to the standard already fixed, a favorable report is prepared. Should they fall below this standard, the manufacturer or inventor is called in conference and in many cases the assistance given him by the laboratories' engineers has resulted in correcting such features as were found to be substandard. When a favorable report has been rendered by the engineers of tests, it is passed upon by one of five councils, namely, fire, casualty, electrical, automobile and burglary. If the vote of the council is favorable the device passes into the class of listed articles. A summary of the report is printed on a card, which is filed according to classification, and cabinets containing these card systems are maintained in the offices of the principal boards of underwriters and inspection bureaus as well as by many public and private organizations and government, state and municipal departments. These are available to the public at large.

In order that any device once passed and listed shall be known to maintain the standard certified by the laboratories' favorable action, three forms of follow-up service have been adopted and may be used at the option of the submitter. The oldest of these, re-examination service, consists of tests made from time to time of samples obtained in the open market by the laboratories' representatives and without the knowledge of the manufacturer. The second, inspection service, comprises tests made by the laboratories' inspectors at factories during manufacture. The third follow-up plan is the label service. This, as its name implies, consists in affixing the laboratories' label at the factory to such goods as are shown to be standard by the tests of the laboratories' inspectors on the spot. In all three forms of follow-up service, should a device be found to be subnormal, the laboratories' approval is withheld until the original standard has been re-established.

The main plant of the laboratories in Chicago contains something over 50,000 sq.ft. of floor space. An electrical laboratory is also maintained in New York at 25 City Hall Place, under the charge of Dana Pierce, vice-president, and a special fuse-testing plant is in operation in Kingsbridge. In these laboratories, and especially in the main plant in Chicago, every conceivable variety of tests relating to fire and accident hazards is carried on. An idea of the importance and magnitude of some of the tests may be gathered by reference to the recently issued book on column tests which was made at the laboratories in co-operation with the Associated Factory Mutual Fire Insurance Companies, the National Board of Fire Underwriters and the Bureau of Standards. This report consists of 388 pages and took about five years to compile.

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*Abstract of paper presented at the annual convention of the American Electric Railway Engineering Association, Atlantic City, N. J., Oct. 3-6, 1921.

Arrangements have been made with the Bureau of Standards and the Bureau of Mines by which these bureaus act as arbitrators in case of a disagreement arising between the submitter of a device and the laboratories in regard to the excellence of such device. Such arbitration, invoked occasionally, has resulted satisfactorily.

The Traction Industry Today and Four Years Ago*

Various Causes Suggested by the Federal Electric Railways Commission for the Condition of the Electric Railways Analyzed to Determine How Far They Prevail Today

By Edwin Gruhl
Vice-President North American Company, New York

THE searching inquiry into the state of the industry by the Federal Electric Railways Commission indicated that its problems were not local, but national in scope. The experiences there recited were so common, the difficulties so similar and the opinions of witnesses on every side so nearly unanimous that no doubt remained that the welfare of the industry was dependent upon widespread economic conditions beyond the control of local managements. One company alone, the inevitable exception to the rule, protested that it had nothing the matter with it. History has since proved that this was not true. The malady was too deep-seated to be cured by faith.

The commission's report was issued in 1920. The picture it conveyed was an essential industry with credit impaired, facing a precarious struggle for existence and requiring emergency relief and co-operation of public and employees to avert a serious breakdown. The patient has been in a worse way since the commission voted its condition as acute, but it has met the crisis and is now on the road to convalescence.

A RESURVEY OF THE CAUSES

A somewhat detailed diagnosis was presented by the commission of the factors contributing to the industry's condition. The causes enumerated are fifteen in number. The first five of these relate to overcapitalization, neglect to amortize this excess capitalization, failure to amortize normal accrued depreciation, payment of unearned dividends and neglect of ordinary maintenance, and overbuilding. In the same group we may place the criticism of underlying companies and leased lines. These causes are historical, and there was no evidence before the commission to lead to the conclusion that they were general. They suggest the diagnostician's inquiry into heredity and youthful indiscretion. They have certainly not been relevant during the past fifteen years of commission regulation. Besides, the fact that roads in receivership or municipally owned are similarly afflicted would suggest these causes as secondary or remote. The contributing cause enumerated as holding companies and banker control falls in the same class. It suggests a reflection on the nurse without whose help, the commission concedes, "many of the operating companies would have gone under before Jan. 1, 1918." Concerning these seven causes no comment need be made in this discussion. If relevant, their present-time effect, though somewhat more removed, has sustained no perceptible change.

EDWIN GRUHL

Five additional causes enumerated as contract fares, limited franchises, special taxation and franchise obligations, use of regulatory power to compel more and better service, and in part automobile and jitney competition, relate to hardships and conditions imposed by the public authorities concerning which important recommendations were made. How these recommendations have been received and followed will be referred to later.

COST OF LABOR

Last mentioned are the economic causes enumerated as increasing demands of labor, the war and the dollar, and the cost of new money. These are, of course, immediate and controlling and merit close examination in the present discussion.

The wage bill represents about two-thirds of railway operating expenses. The average wage of motormen and conductors for companies operating 100 miles and over in 1917 was 31.5 cents per hour. On Jan. 1, 1919, it was 44.4 cents per hour. On Jan. 1, 1920, it was 52 cents and on Jan. 1, 1921, it was 60 cents an hour. A reduction is noted as of Aug. 31, 1921, to 57.6 cents. Out of the sixty-four companies included in this average, twenty-six have reduced wages since Jan. 1, 1921, the reduction in wages made by these companies averaging 10.7 per cent. Yet wages still show an increase of 83 per cent over wages for 1917 and are still 20 per cent beyond the War Labor Board standard.

COST OF MATERIAL AND EQUIPMENT

The commission's report refers to increases in material and equipment prices for the latter part of the year 1919 as compared with the year 1915. For electric railway equipment this increase averaged 64 per cent. For general supplies and raw materials it averaged 178 per cent. On Nov. 1, 1920, the increase in price of electric railway equipment over 1915 prices had grown from 64 per cent to 110 per cent, and a similar comparison as of the middle of 1921 showed a decline to 94 per cent. For the raw material, the increase for November, 1920, over 1915 is 288 per cent, and for the middle of 1921 is 174 per cent, as compared with 178 per cent in 1919.

These comparisons show that prices of raw materials on June 30 of this year are about on the same level as those referred to by the commission as reaching abnormal heights, while equipment prices were actually higher.

COST OF MONEY

About the same tendencies are noted in comparing the cost of money. The "bond index" of the *Wall Street Journal* includes ten utility bonds of which four are street railway bonds. Based on this index the average yield in 1918 for these utility bonds was 6.23 per cent. In January, 1920, the market price of these securities showed an increase in yield demand by investors to 7.17 per cent, or an increase of 15.2 per cent, and in August, 1920, the yield was 8.04 per cent. Since this low point the utility bond situation, as indicated by the index, has slightly improved, and in August, 1921, indicated a yield of 7.32 per cent, which is only 2 per cent above January, 1920, but still 17.5 per cent above January, 1918. If a separation be made between the street railway and other utility securities used in preparing the index of utility bond prices, it is noted that whatever improvement has been made has not been due to street railway securities. There has, accordingly, been no betterment in the cost of money; in fact, conditions as represented by an analysis of the market would indicate that the credit of the industry has until quite recently been at a lower ebb than when the commission made its report.

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*Abstract of a paper presented at the annual meeting of the American Electric Railway Association, Atlantic City, N. J., Oct. 3-6, 1921.

THE PROGRESS IN APPLYING REMEDIES —INCREASED FARES

The principal recommendation of the commission was that emergency relief be provided through increase of fares. Such increases have been general and are still in process.

On Jan. 1, 1918, the highest rate of fare charged by street railways operating in cities of 25,000 population or over was 6 cents. Out of 300 operating systems, there were on that date twenty-five which were charging a 6-cent fare, five with zone systems of various kinds, and the balance, or 269, were operating with a fare of 5 cents or less. By Sept. 1, 1921, the number of 10-cent systems had increased to fifty-seven, the number of 9-cent systems to six, the number of 8-cent systems to thirty-six and the number of 7-cent systems to eighty, giving a total of 179 which were operating at fares greater than 6 cents as compared with 102 on Jan. 1, 1920, and none on Jan. 1, 1918. There were only forty-nine systems remaining out of the 300 which were operating at 5 cents as compared with 103 on Jan. 1, 1920, and 269 on Jan. 1, 1918.

The general tendency has apparently been to retain the existing flat fare system rather than to obtain relief by charges for transfers or by instituting a tariff based on distance traveled. The number of systems operating under a zone fare of any sort has only increased from five on Jan. 1, 1918, to fourteen on Sept. 1, 1921. This small net increase over the entire period is due in part to the fact that certain systems which at one time during the period were operating under zone fares of one sort or another have reverted to a flat fare.

An average street railway fare has been computed for all cities in the United States over 50,000, except New York City, weighted on the basis of population. On Jan. 1, 1918, this average was 4.92 cents per revenue passenger. At the same date in 1920 the average increased to 6.29 cents per passenger, and on Sept. 1, 1921, it had further increased to 7.25 cents per passenger.

These increases are so substantial that the question naturally arises as to why their effect has been so negligible upon the net income of the industry. One reason lies in the widespread depression of traffic; another in the sustained high levels of cost of operation, in which labor is so important an element. As of Sept. 1, 1921, wages show an average increase of 104 per cent since 1914; fares an average increase of 50 per cent.

ECONOMIES OF OPERATION AND PUBLIC CO-OPERATION

The commission recommends that the industry put into effect such economies of operation as will enable it to give good service at the lowest cost. Among these it enumerates the elimination of deadheads and other free service, the abandonment of non-profitable lines, substitution of one-man cars, modification of special taxes for paving and snow removal, the reduction of rentals and power rates as may on investigation prove excessive, the co-operation of the public in developing faster schedules and installing skip stops at convenient places, rerouting, use of trail cars, keeping car tracks clear of traffic, and the regulation of vehicular traffic. Many of these economies are beyond the control of the management, and the commission admits that in some cases they entail legislation and the co-operation of public authorities.

A survey of what has been accomplished along these lines discloses generally a record of economy and efficiency by the industry, but the record of public co-operation is disappointing.

No appreciable progress has been made in the elimination of free transportation service, principally because this is a franchise requirement. The one notable exception is the step made by Seattle upon the acquisition of the railway lines to charge for policemen and firemen.

Abandonment of non-profitable lines has as a rule been limited to sections of track in districts served by adjacent lines of the same company or by other forms of transportation. The most extensive abandonments for this cause have occurred in Massachusetts under trustee control and in New York City under receivership. In fact, much municipal commission and court action has been to restrain action on abandonment of non-paying lines on the general grounds that convenience and necessity of the public knows no economic law.

The use of one-man or safety cars has very largely increased. In some instances—as in Terre Haute—entire systems are now one-man operated. In the majority of cases, however, one-man cars of either the standard single-truck type or of larger types are being operated on lighter traffic lines to permit the furnishing of more frequent service at a lesser cost.

Of forty large companies where the skip stop was in use during the war, only sixteen companies still use it in regular service. In most cases it was adopted as an emergency measure to save fuel, and the selfish interests of the few people inconvenienced have in many cases convinced regulatory bodies that the need for such economy no longer existed, to the detriment of service and comfort of the large number of long-distance riders. Where the skip-stop scheme was installed after thorough study, and has been properly administered, it is in many cases still in effect.

The relief afforded to the industry as a whole by modifications of or relief from special taxes, paving obligations, sprinkling, etc., has been so meager as to be almost negligible. The association reports six companies which have been relieved of paving obligations under existing franchises. All of these are small companies, and in some of the cases the relief is not permitted, or is contingent upon special conditions. Out of twelve active or proposed service-at-cost franchises, only four make any concessions to the operating company relative to paving or sprinkling requirements. The most extensive and important remedial action is that recently taken by the Connecticut Legislature, whose action is a long step in the right direction, although it still leaves some things to be desired.

The problem of achieving operating economies and improving service by rerouting has perhaps received more attention than some of the other means suggested. Kansas City, Akron, Indianapolis, San Francisco and Milwaukee are among those cities where extensive changes in car routings have been made, and numerous other cities are working out the same problem.

Some advances have been made toward the extension of trailer operation. Chicago has recently joined the list of seventeen companies which were operating trailers in 1920 and prior years. Companies using trailers have generally appreciated their value in the economical handling of rush-hour crowds and have continued to increase the number in use.

The traffic regulation in large cities is gradually improving, and in many cases police departments are beginning to appreciate the advantages and importance of keeping street car tracks free from congestion. The general tendency has been to increase the restrictions on automobile parking in the downtown areas, and many cities now prohibit such parking on main thoroughfares. Chicago and Pittsburgh are recent examples of earnest efforts to speed up traffic in the congested districts.

As for the earnest suggestion of the commission that extensions should be paid for by assessments on outlying property benefited, no single instance is yet on record where this advice has been followed.

MOTOR COMPETITION

The commission expressed some concern for and recommended efficient regulation of jitney and motor bus competition.

Data before the commission showed a registration of 6,100,000 motor vehicles in the United States on Dec. 31, 1918. At the end of 1920 the registration shows an increase to 9,200,000 motor vehicles. The figures indicate a situation about 50 per cent more serious from a competitive standpoint than that to which the commission referred.

Such state regulatory measures as have been passed during the past, notably in New Jersey and Connecticut, do not seem to be working satisfactorily in practice. Proposed legislation in other states, notably California and Wisconsin, to regulate the business has failed of passage. Even in "service-at-cost" cities, like Toledo and Youngstown, jitney competition has been pronounced. In Kansas City a compromise was reached in March of this year by an ordinance which still permits jitneys to run on streets not occupied by car tracks. Jitneys were ruled off the streets of Seattle by the municipal railway over a year ago, but are reported as still operating.

While the motor bus has the advantage of low investment and small overhead expense, and greater speed and flexibility of operation, the operating cost of a motor bus per seat-mile is practically twice that of an electric car. It is not likely, therefore, seriously to menace the industry except during periods of unemployment. Where railways have been forced to wear the jitney out by competition, a scheme of fares which makes patrons regular customers, such as the dollar pass, and frequent service with one-man cars have been effective weapons. Many companies have met the problem by the operation of motor buses in effecting extensions of existing routes and in creating entirely new routes. The motor bus operated as a supplement to the railway service, or the trackless trolley with its combination of economy of operation and low investment cost, may yet be the method of relieving the electric railway from finding large amounts of new capital each year to finance extensions which will not be self-sustaining for some time.

Differential Fares

The commission finds that the failure of the electric railways to vary flat rates of fare for transportation service based on the length of the ride is "one of the contributing factors to their present financial condition." It points out that the industry is the only public utility which has consistently adhered to a flat rate fare basis, but believes that the introduction of a zone system of fares is a matter which should be decided by the community itself because of the social problems involved.

The two major experiments with the zone type of differential fare which has been made in this country during the last four years are those of the Public Service Railway of New Jersey and of the Connecticut Company.

In spite of the failure of these two large companies successfully to institute and operate a differential fare, other smaller properties have met with better success. The San Diego Electric Railway of California installed on Jan. 1, 1920, a differential fare made up of two 5-cent zones with important ticket concessions. The result was that traffic increased and the company has been satisfied that it is getting the maximum revenue which any system of fares would produce, and this is being done with no attendant difficulties in fare collection. In Massachusetts the cities of Holyoke and Springfield have been operating with a differential fare for approximately three years. In Boston the flat fare is 10 cents, but the company has recently instituted 5-cent local fares in several of the outlying communities. The results of this experiment seem to indicate that the increase in local riding has justified the fare concession.

In Milwaukee the differential fare which has been in effect since 1914 is still operative with only minor modifications. The necessary revenue increase which the company needed, however, has been obtained by an increase in the flat fare charge in the central area rather than by retaining a low flat fare and increasing the number of zone fares in the outlying districts. New experiments in the way of differential fares have been tried in Racine and Kenosha, Wis., and in Racine and Iowa. In the first two of these cities an unlimited ride pass is sold for $1, which is good for transportation for one week. In Mason City it is possible to purchase a monthly ticket which entitles the holder to ride for 5 cents per trip instead of the regular fare of 10 cents.

With the return of normal traffic and decreasing costs, it seems certain that increased flat rate fare will tide the industry back to normal. High fares, however, will not stimulate the confidence of investors and some form of differential fare may be the means of meeting competition and improving revenues.

Experience with Service-at-Cost Plans

The commission, to quote direct, "strongly recommends the principles of the service-at-cost contract not as the only solution but as one means of solving a very difficult problem." The survey of recent experience with service-at-cost plans discloses somewhat disappointing results. This is particularly true of those plans which incorporate a fixed fare policy with automatic variation in unit fares and a fixed upper limit.

Cleveland reached its maximum rate of fare under its service-at-cost plan of 6 cents cash, nine tickets for 50 cents and 1 cent for transfers, on Nov. 14, 1920. Despite a reduction of 10 per cent in wages of all officers and employees, except trainmen, on Feb. 1, 1921, and 20 per cent in trainmen's wages on May 1, the $500,000 interest fund by July, 1921, has dwindled to $139 000, less than nothing, and, due to insufficient operating allowances, maintenance and renewal reserve accounts disclose in addition a deficit of over $500,000. It is reported that service has been considerably curtailed, a five-day week has been established for shopmen, all but most vital maintenance work has been postponed, and further wage cuts are contemplated. Finally, because the company was unable to secure new capital under the restrictions imposed by the ordinance, the directors have authorized the officers to take the funds for all expenditures for new work from the maintenance allowance.

Cincinnati reached its maximum rate of fare of 9 cents cash and 8½-cent tickets on July 1, 1920. The increases have been made in ½-cent stages in accordance with the service-at-cost plan. A straight 9-cent fare contemplated on March 1, 1921, was enjoined by the city. Meanwhile the result of ensuing litigation has been a revision in the original contract whereby the company is temporarily relieved from the payment of the franchise tax and the accrual of certain reserves, in return for which fares have been reduced to 8 cents. The company's report for 1920 shows a deficit over the cost of operation of $665,000, and the total accrued deficit to April 30, 1921, was reported at over $806,000.

The Dallas service-at-cost agreement is based on a 7 per cent return on the agreed valuation of the property. Its 5-cent fare continued from the time the contract went into effect in 1917 until June 17, 1920, when the fare was increased to 6 cents. By Dec. 31, 1920, the deficit in the stipulated return on capital allowed by the ordinance was reported at $651,000. Application for a 7-cent fare was denied by the city on May 2, 1921. The company filed with the city commission a request to continue the 6-cent fare, this rate automatically expiring by limitation after one year's operation.

Under the service-at-cost franchise of the Montreal Tramways, 6 per cent was allowed on capital, 7 per cent on additions to capital and 6 per cent interest on working capital. At the end of the first year's operation, June 30, 1919, the receipts failed to meet cost of service by over a million dollars. By the end of the following fiscal year, June 30, 1920, the cumulative deficit had increased to $1,700,000, and by the fiscal year ended June 30, 1921, the cumulative deficit amounted to about $2,000,000, including payments due the city. In these years the company has been unable to make the annual half-million dollar payment to the city of Montreal for the use of streets as defined in the contract. The standard fare of 6 cents was raised in August, 1919, to 7 cents cash, four tickets for 25 cents and special tickets to workmen of five for 25 cents.

In Rochester a service-at-cost plan became effective in August, 1920, with a 7-cent fare. It has been necessary to draw upon a $300,000 balancing fund. By October 30, 1920, a cumulative deficit is reported in this fund of $106,000. No further figures have been issued.

In Toledo the community traction plan was inaugurated in February, 1921. The plan began with a cut in fare from 7 cents to 6 cents and transfer charges from 2 cents to 1 cent, with tickets of eight for 50 cents. In August of this year the ticket rate was increased to six for 40 cents, with no change in the cash rate. The stabilizing fund was reported in September as standing at $140,000, instead of $300,000. It must rise to $500,000 before a reduction in fares is possible. The published estimate in February indicated that the jitneys were taking at the rate of $425,000 a year in revenues from the company.

The report comes from Memphis, which is enjoying both service under a service-at-cost arrangement and a receivership, that deficits have been incurred of $200,000 by July 31, 1921. In August the company announced the discontinuance of ten tickets for 65 cents in favor of a straight 7-cent fare, with the prospect of an 8-cent cash and ten tickets for 70 cents rate if the drop in riding did not stop.

The Massachusetts service-at-cost plans appear to be operating more satisfactorily. Because of the strict and early regulation of securities, overcapitalization has not been possible. Nevertheless, the electric railways of that state appear to have been in no better position than those in other states of the Union. Of the thirty electric railways only five have earned and paid dividends in cash on their capital stock of at least 5 per cent each year for five consecutive preceding years without impairment of assets. In pre-war years there have been as many as two dozen companies which have done this. It is significant that out of the five survivors, three are companies whose dividends are guaranteed by leasing companies.

Massachusetts street railways can be aided by contributions from public funds to an amount not exceeding $1 per $1,000 of assessed valuation in towns and 50 cents per $1,000 of assessed valuation in cities. The Massachusetts Department of Public Utilities in its report of April 1, 1921, points out that the amounts which can be so contributed under the statute are "so small a sum as to make the whole method practically valueless." It recommends that this "limit should be increased so that communities may be freer to contribute larger amounts for this purpose." The report shows that no action has been taken by the state along the lines recommended of remitting paving taxes. It shows for the 371 miles of track discontinued in the five years preceding April 1, 1921, that "nearly all of these lines served the convenience of their localities and helped in their growth and development." Auto bus transportation which has been substituted is reported as working well in some places and poorly in others.

The Massachusetts commission has apparently made a sincere effort to reach a solution of the traction problem. It is evident that it has not been possible under existing conditions to place its street railways upon a self-supporting basis, regardless of the rate of fare.

The two largest systems in the state, the Boston Elevated Railway and the Eastern Massachusetts Street Railway, are operating under special service-at-cost arrangements. The freedom of action allowed the trustees in fixing fares and levying upon the tax fund has permitted the uninterrupted working out of a five-year program of reconstruction. Important operating economies which would not have been possible except under public control have been inaugurated, and a trial has been made with the differential fare to encourage short-haul riding and the right secured to operate motor buses.

The Eastern Massachusetts Street Railway has also been under the control of a board of trustees since June 1, 1920. These trustees are also empowered to charge any rate of fare that will bring the maximum revenue necessary within each district, but they lack the Boston Elevated trustees' power of arbitrary pro rata assessment. The trustees have created sixteen operating districts, in each of which the cash fare was placed at 10 cents. Regular riders, however, were able to avail themselves of punch tickets at rates ranging from 6¼ to 8½ cents per ride. As a number of the operating districts failed to meet the cost of service, including 6 per cent on the valuation established by the Public Service Commission on the property operated, they have been given the alternative of contributing from taxation or losing the service. Two towns, Gloucester and Hull, which refused to make such contributions, have had service discontinued. Service has also been withdrawn from three additional towns, Woburn, Burlington and Billerica, for failure to curb jitney competition. Reports of the trustees show that for the six months ended June 30, 1921, the cost of service was earned by a slight margin, whereas there was a shortage to achieve the cost of service for the corresponding period in 1920 by $1,368,000. One-man cars are now reported as handling more than 80 per cent of the traffic. Non-paying lines have been ruthlessly abandoned, service on 123 miles of track having been discontinued.

It is apparent that the Massachusetts service-at-cost plan, with its greater flexibility, freedom of action to promote economies and power to compel co-operation by the municipalities served, has made further progress in solving the traction problem than other contractual arrangements.

MUNICIPAL OWNERSHIP

The commission does not recommend public ownership. It finds "that there has not been sufficient experience with public ownership and operation in this country to recommend it as a permanent solution." It points out, however, that the experiments being made in this direction will be watched with interest. This discussion would not be complete without a brief review of the more important changes in the municipal ownership field.

The Municipal Railway of San Francisco operates 68 miles of line selected with respect to greatest tributary traffic density. The fare has remained at 5 cents. Published reports show a deficit of $137,000 at the close of the fiscal year ended June 30, 1920, and the advance report for the fiscal year ended June 30, 1921, announces increases of over 6 per cent in operating revenues as against only 3 per cent in operating expenses, leaving net earnings which are declared to be more than sufficient to meet all overhead charges.

The Seattle Municipal Railway, according to the report for the first seven months of operation ended October 31, 1919, disclosed a profit, but according to the comptroller's analysis of the operations for the year 1919, there was a net loss of $517,000. In June, 1920, the fare was raised from 5 cents to 7 cents cash, with fifteen tickets for a dollar. In July of the same year the cash fare went to 10 cents, with tickets at the rate of four for 25 cents. As the increased revenue still fell short of meeting expenses, the ticket rate was increased to 8⅓ cents on Jan. 8, 1921. A great hindrance to the successful operation of the municipal lines has been the continuance of severe jitney competition, which became particularly noticable after the last increase in rates.

The creation of the Detroit Municipal Railway followed rejection by the people of that city of the purchase of Detroit United Railway and the voting of $15,000,000 of funds for construction and operation of a supplementary system. The city built 18 miles of track in 1920 and is reported to have under completion 83 miles in 1921. Negotiations have been opened for the purchase of tracks of the Detroit United Railways on which franchise rights have expired. Significant features of the Detroit situation are the operation of one-man cars and the impending purchase by the city of trackless trolley buses.

Late in 1920 the city of New York found it necessary to continue operation of the Staten Island Midland Railway, which had suspended for lack of funds. By arrangement with the receiver the city undertook to furnish seventy-one safety cars and to operate the property through its Department of Plant and Structures, and to share any net revenue with the owners of the railway. The report for the first seven months ended June 30, 1921, shows a final net balance after taxes and depreciation of $4,000 on total revenues of $25,000. The fare charged is 5 cents.

The city of Toronto on Sept. 1, 1921, took over the operation of the line of the Toronto Railway and merged these with the Toronto Civic Lines. The Toronto Railway served only the territory within the old municipal limits, so that the passengers from the Civic Lines in the suburban territory paid a second fare on a second car of 5 cents cash in the city and six tickets for 10 cents on a short suburban route. The Transportation Commission has announced that instead of a universal 5-cent fare the rate will be 7 cents cash for adults, or four tickets for 25 cents. It is significant that the jitneys were ordered off the streets at once.

Public ownership has become less popular only because more people think that it is likely to prove a losing venture. The early advocates of this principle have ceased to talk about profits and now openly advocate low fares with deficits supported by taxation. The opportunities under municipal ownership for lightening burdens to which the industry is still subjected are so substantial that it is entirely possible that the solution of the traction problem may be found along this line.

CONCLUSION

A review of the comparative position of the traction industry four years ago and today discloses that it has in the intervening period passed through the most critical period in its history. The financial condition actually became worse than pictured by the Federal Electric Railways Commission. Some of the solutions of the problems confronting the industry recommended by the commission have been availed of and produced results; others have not received appreciable recognition by public authorities and accordingly have been inoperative.

The difficulties confronting the industry are as acute today as they were at the beginning of the four-year period. We have made some progress in learning that some hoped-for solutions have proved ineffective.

ABNORMAL COSTS STILL PREVAIL

Recent months show some turn to better conditions. Perhaps it is because the turn has been so recent that there is yet so little indication of readjustment and satisfactory settlement. Unlike other industries, the street railway is still confronted with the abnormal costs which have been the aftermath of the war. But the problem of readjustment seems to be much bigger than the mere forcing of operating costs back to normal; the restoration of 1913 conditions of traffic, revenue and expenses would not produce a buoyant industry. A great deal of useful work of ultimate benefit to the industry has been done during the last four years, but it can be regarded only as preliminary to the final readjustments that must come if the business is to enjoy prosperity.

The Interest of the Manufacturer in the Electric Railway Industry*

Transportation Is Necessary to Manufacturers as Well as to Community Welfare—Various Ways in Which They Can Help the Railways Are Outlined

By E. F. Wickwire
Sales Manager Ohio Brass Company

IT HAS been said that a crisis must always be reached before a revolution can take place. It is not impossible that we are on the verge of a revolution in the electric railway industry.

And no doubt we will welcome it, if it can be brought about through the application of new ideas to existing facilities and the utilization of new methods to improve the present situation—all inspired by the conditions which have brought forcibly to us the realization of their need. Perhaps after all this is our opportunity, to which we must rise in order to advance. Nothing can stand still and progress—not even a trolley car.

The present difficulties of the electric railway industry are too well known to you to warrant my taking up time attempting to enumerate all of them. But, generally speaking, what is there back of most of these things that permits them to exist? Isn't it pretty largely a matter of public opinion, or, in other words, the average man's mental attitude toward the traction company?

Could many politicians and a certain class of newspapers continue to use the street railway as a football if the public generally understood the real motives back of their efforts—that the politician is simply after a job and the newspapers referred to are stirring up agitation for the sole purpose of promoting their circulation and not at all because of their love for the "dear people" whom they are fooling? Some one has said that "in our country most of our troubles are produced by those who do not produce much of anything else." People of that class, of course, do not want the street railway question settled. And perhaps we cannot hope for much from the fellow who likes to argue and will not listen to reason. You know some men like an argument so well that they will not even "eat anything that agrees with them."

A CONCERTED EFFORT IS NECESSARY

In other words, the problem resolves itself largely into a matter of education. And if we manufacturers and railway men do not make a concerted effort and carry on a vigorous campaign to educate the public and convince them of the fairness of our proposition, then who is going to make such an effort along the right lines? And if you do not realize just how difficult this matter of educating the public is, if you do not appreciate how unsophisticated some people really are, just keep your eyes and ears open all around you in your own home town and you will soon begin to realize it.

TRANSPORTATION NECESSARY TO MANUFACTURERS

We in the manufacturing business are keenly alive to the fact that electric transportation in, around and between cities is vital to the development and progress of any community. We know the value and importance of locating our plants adjacent to such transportation. A city otherwise desirable is comparatively unacceptable if workmen employed in the plant are deprived of trolley facilities for readily reaching their homes after the workday. And if every city were so interlaced with trolley service as to make shopping more accessible, I cannot but feel that trading would flow more evenly instead of intermittently.

One of the most forceful illustrations of the effect of lack of trolley transportation upon a community happened not long ago in a well known city in Ohio, where, after a long drawn out fight between the city officials and the railway company, the property was abandoned and the rails torn up. A short time afterward the town endeavored to induce an important manufacturing industry to locate there. The town was well situated, possessed good steam railroad facilities and many other advantages. But when the representatives of the industry referred to found that the town had no street car service, they refused absolutely to further consider the question of locating there and went to a neighboring town where the street car service was good.

TRACTION SERVICE A BIG ASSET

This is a significant indication that the mere fact of having street car service is a big asset to a community, to say nothing of the real benefits derived from the service. In other words, a town that has no electric railway service presents the appearance of a deserted village, and no amount of jitney buses can overcome that handicap. In the town I have referred to, if all the jitney buses in the State of Ohio had been assembled in that town, it would have failed to satisfy officials of the new industry that the trolley was not needed. Nothing has been developed that will adequately take the place of the trolley car, and the sooner people wake up to that fact the better it will be for the country and for all of us.

Some people who are in the habit of getting around in their own motor cars perhaps don't fully appreciate how useful the trolley car really is—unless perchance they become identified with a suburban real estate development, when they very quickly begin to realize what a fine old substantial asset a good electric railway system really is to a community, and how much it will add to the value of their property. Every live real estate man will tell you that if he can point to established electric railway service to his allotment, it is the very best selling argument that he has.

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*Abstract of paper presented at meeting of American Electric Railway Association, Atlantic City, N. J., Oct. 3-6, 1921.

EMPLOYEES CAN BE EDUCATED

We can tackle this matter of educating the public in many ways, but to begin with, we can educate our own employees. I will venture to say that the large majority of employees (and I do not mean factory workmen alone) connected with industries whose welfare is largely dependent upon the prosperity of the traction companies and other public utilities have not the right mental attitude toward those public utilities from the public service standpoint. And these employees perhaps form a more influential part of the general public than we have realized. And most of them do not even connect the unjust criticisms that they hear and read against the traction companies with the fact that these criticisms are directed against the very industry upon which they are actually dependent for a livelihood. If we can awaken them to that fact alone, we will have accomplished a great deal in this campaign of public education. And I believe that we can go still further in that direction and educate our employees to a point where they will have a pretty fair general knowledge of the real electric railway situation, so that when they mingle with their friends and the general public they will take the trouble to defend the industry of which they are a part and perhaps even fight for a square deal for the electric railway.

We manufacturers can carry on this work in various ways. For instance, our company is running a series of educational articles in a little monthly publication that we distribute to all of our employees. We, of course, try to word these articles in simple, direct language that will be understood by the average workman in the factory, and we use some illustrations whenever possible to make the article look more attractive and to emphasize some point more clearly. We find that the employees usually take these little monthly publications home, which is also a good thing, as you will appreciate—especially where they have large families who read them.

A SLOGAN MIGHT HELP

We also supplement the printed articles by giving some short educational talks to the men at some of our factory employee association meetings. And we are even considering the advisability of using some attractive printed slogan or pointed comment on our pay envelopes. For instance, we might say:

When the Trolley Cars Stop
Our Pay Takes a Drop.
When the Trolley Cars Run,
Ain't We Got Fun.

Not dignified perhaps, but we are after results, not dignity.

Now is an exceptionally opportune time for the manufacturer to carry on this educational work with employees. There are very few workers who have jobs who cannot see general conditions around them and in turn appreciate more than ever what their own job really means to them. For instance, I recently heard of a case in one plant where a worker who a year ago was showing signs of radical tendencies, upon leaving the factory after a short day's run, met a factory staff member and asked him to tell the sales force to "get busy and get some more orders," because he and his family needed the money resulting from a full day's work. This fellow's mind right now is probably most receptive to the kind of educational work I have outlined, and you may be sure that in his predicament, if once awakened to the needs of the industry, he would lose no opportunity to carry the word along.

Again, what proportion of our employees riding by trolley each morning and home again each evening fully realize what the traction service really means to them, their work and their families. Perhaps a few do, but many take it as a matter of course, and here again we can teach our workers to "fight for the cause" if we educate them to look upon the traction companies as real benefactors.

GETTING BACK AT THE COUNCILMAN

There are many other ways in which the manufacturer can promote this work. For instance, a factory manager recently attended a Council meeting where one of the Councilmen—a merchant—started a tirade of abuse against the local traction company. The factory manager interrupted, asking, "What plants are running to any extent in this town? The match factory?" "No." "The rubber works?" "No." "The chemical plant?" "No." "Then what plants are running fairly well?" asked the factory manager. "Well," said the Councilman, "your plant seems to be running much better than the others." Then, said the factory manager, "Do you realize that we are running on business secured from public utilities, including the electric railways, and you, as a merchant, are getting the benefit through the trade that you secure from our employees? Then why assume such an unfair attitude toward an industry that is contributing largely to the business you have in your store?" And the merchant-Councilman modified his attitude when he found he had to reckon with the employees of the busiest factory in town, instead of playing the popular old game of knocking the railway. Although small in scope, this incident illustrates one of the many ways that we in the manufacturing business can use to further this educational work.

Another means by which the manufacturer can help this work along is by getting articles of an educational nature into the newspapers. Oftentimes a manufacturer can get a newspaper to publish such an article when it would be impossible for an electric railway company to do so. We have had articles of that nature sent to us, which we have been able to dress up with local color and have published in our newspapers.

Then, again, we manufacturers belong to Rotary and Kiwanis clubs, chambers of commerce, manufacturers' clubs, etc., in which we can very easily accomplish a great deal in getting people thinking along more liberal lines on this electric railway problem. Many of us also manufacture materials that are sold to other classes of trade than public utilities and we can spread the gospel in that direction in various ways, not forgetting to sow a little seed with those from whom we buy raw materials.

Another important phase of this subject that I would like to touch upon before closing is the fact that we manufacturers who are largely interested in making materials for electric railways and other public utilities have quite an army of employees that can be rallied to the support of the industry in legislative matters, if properly organized and directed. So far as my observations have gone, I do not believe that this association has really made a well-directed effort to enlist the support of the army of workers, and I am sure that they can be used by us as a strong influence in behalf of the industry in State and national legislative matters and perhaps even in municipal affairs.

I believe that this association has, in the field that I have outlined, a magnificent opportunity to enlarge the scope of its work and take more active steps in the direction of getting the tremendous advantage of the full strength and support of these workers back of our efforts to obtain a square deal for the electric railway industry. Our association might even exchange ammunition with the National Electric Light Association, or possibly combine forces with it in this work wherever we have interests in common.

LET'S HAVE UNIFIED TRANSPORTATION

In closing, I would like to emphasize the fact that I believe we have arrived at that period when there must be more proper and more drastic regulation of the use of public thoroughfares for public transportation. In other words, jitney buses which come and go, and other means of hauling people which are competitors of the regular and the responsible systems, all tend to the depreciation of public service rather than to its betterment, and so I cannot but feel that the time has arrived when municipal administrations must be made to appreciate that one franchise, properly safeguarded for the public interest, must be granted, and confined to a single transportation company, which would furnish all transportation service which could be used to advantage in the community that it serves. Under this plan the transportation company can invest its money, earn a sufficient revenue to justify the investment and give the public the service that it must have.

Street Railways as an Investment*

Future for Urban Railways Assured as a Utility, but Pleasure Traffic Is Dead—Reduced Rate Tickets Are Useful—Rule for Prodigal's Return Home Is Given

By Roger W. Babson and Olin W. Hill

THE future of the street railway depends on its treatment from the proper standpoint—that of the public utility. It has ceased to be the public's plaything. Most of our street railway troubles come from the old idea that its principal reason for existence was to satisfy the—financial, political and literal—"joy rider."

In the readjustment of the last few years the street railway has but followed the history of all our other modes of transportation—the horse-drawn buggy, the roller skate, the bicycle, the automobile, and the jitney. Each in turn has had its day as a fad, followed by a reaction. Then, in the case of those for which a practical need had been found, there developed a substantial, steadily growing demand along staple lines, without any spectacular features. The readjustment has meant necessarily the elimination of large amounts of capital employed to satisfy a temporary and freakish demand.

The electric railway systems of this country comprise an industry involving over $5,000,000,000 capital with a gross business in excess of $1,000,000,000 a year. It falls within the group of less than a score of industries exceeding $1,000,000,000 gross and, by a curious coincidence, ranks next in size to another transportation industry, the boot and shoe business. In respect to percentage of gross income expended in pay rolls for labor—about 46 cents out of every dollar taken in—it outranks practically every other industry except watch making and the steam railroads. When we come to look at the net earnings, however, this great industry comes far down in the list, saving slightly less than 2 per cent of its gross for net. It has not the advantage, inherent to man industries, of a rapid turnover of its capital. There are comparatively few manufacturing concerns that can get along on a lower basis than gross turnover annually equal to the total capital devoted to the enterprise.

The street railways, with $5,000,000,000 capital and gross revenue of $1,000,000,000, are getting their money back at the rate of only once in five years. In the case of Boston Elevated, where the issue of securities has been so carefully supervised that no question of water in the capital has ever been raised, with a total funded debt direct or guaranteed of $44,000,000 and capital stock direct or guaranteed of $46,000,000 additional, making a total capital account in excess of $90,000,000, this system shows gross earnings, even with a 10-cent fare, of but little over $33,000,000 a year.

ROGER W. BABSON

In passing, take notice what the significance of this is as to the necessary charge-off for depreciation. If your plant, new, is reckoned good for thirty years, depreciation alone must eat up 15 per cent of gross earnings on the average, and 9 per cent to 10 per cent even in the case of Boston Elevated. How much of your plant is good for thirty years—and how many systems have made any such allowance for depreciation?

In analyzing an industry, two factors that must be borne in mind are, the fixed investment represented in plant for a given capacity of product, and the absolute limit at which price becomes prohibitive to the consumer. With the high plant cost to which this industry is subject, and the narrowly limited unit price for its product, we come then to the conclusion that only by the fullest and most constant utilization of plant can success be attained. This constant and full utilization is to be found in our large centers of population. There is no question about full traffic on almost any of the city lines.

We are led, then, to our first conclusion. The future of the street railway is found in the urban road; particularly, those lines which have some element of rapid transit combined and which, either by original supervision or through the fires of reorganization, have a fair capitalization. For the lines operating in congested centers the private automobile has little competition to offer. As a matter of fact, the greater the number of automobiles, the more indispensable is the city railway with its elevated or subway connections for convenience of getting about. We may run about the suburbs and small towns as we do with our automobiles, but when we are going in town we often park our car at the outskirts and complete the trip by street car—or else take a subway or elevated.

Our second conclusion is that the pleasure business of the street railway industry is dead. Whereas formerly the suburban lines catered to pleasure travel and looked for the biggest business on Sundays, the condition now is that Sunday travel is the smallest. There has been a large waste in the establishment of outlying pleasure parks and summer resorts as a street railway enterprise which may as well be regarded now as money thrown away. As far back as 1917 the total gross income of all the street railways of the country amounted to exactly 5¾ cents per revenue passenger carried. Clearly the average rider is the short haul urban passenger, not the long haul pleasure tourist out into the country.

The jitney will never kill the street railways. But the operating expense account can, and will, unless it is carefully watched and studied. Gross earnings of the total street railway mileage of the country have in no single year shown a decrease, going back to 1904 and coming down through 1920. This fact may surprise even some of you. Neither can it be shown that there is any trend to a decline in the total number of revenue passengers carried per year. Statistics on this point have become less satisfactory with the introduction of the zone system and the cash fare box. So far as the lack has been supplied by estimates, however, the consensus of opinion is that the street railway is still carrying between 11,000,000,000 and 12,000,000,000 revenue passengers annually

In other words, ten times the number of passengers are being carried on the street railways as are carried on the steam roads. There are fluctuations in traffic, of course, following very closely the general prosperity or depression. There is a general tendency for the habit of car riding to increase. This is striking in the case of New York City, where the revenue rides represented 304 trips per capita in 1909, 370 in 1919 and 421 per capita in 1920. In Boston, on the contrary, the fare increase has diminished the habit. Taking the population of the city proper as a basis—which, of course, is not exact—revenue passengers represented 545 rides per capita at the peak of traffic in 1917 and only 430 rides per capita in 1920.

It is the net earnings line that has shown a constant tendency to decrease from about 1912 until well into 1920. The operating ratio of the street railway industry was 57.5 per cent in 1902, according to the census. The latest available figures for comparison indicate an operating ratio very close to 77 per cent.

In our study of fares, we find them ranging all the way from a maximum of 10 cents, the standard on Boston

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*Abstract of paper presented at the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 3-6, 1921.

Elevated, to a minimum of 5 cents on the New York railways. A deal of experimenting is being done. It is recognized that there is a point beyond which fares cannot go without loss of revenue. Most roads have reached this maximum and some are voluntarily reducing. Not only do higher fares discourage travel but they encourage demoralizing jitney competition.

The solution lies in a cash fare of 8 or 10 cents, with the sale of tickets at geatly reduced rates. One of the divisions of the Eastern Massachusetts, granted a 10-cent fare, first sold twelve tickets for a dollar, then fifteen for a dollar, then seventeen for a dollar, and this month is giving eighteen for a dollar, which is almost back to the old 5-cent fare. The headquarters for this division is Lynn. The statistics of fare reduction there make an interesting study for one interested in street railway transportation. Remember that the cash fare is 10 cents in Lynn today, but the man who rides every day can buy eighteen tickets for a dollar. Moreover, the first of next month the company will issue similar tickets, nine for 50 cents, purely with the idea of encouraging riding. It will still try to sell the man one dollar's worth of tickets, but they will be on two cards, so that two members of the family can each have a card with the same amount of family money invested.

Apparently pleasure riding is about over. The development of parks, white cities and playgrounds has become wholly a thing of the past. Where Sunday used to be the great day of the week, it now, on most roads, is one of the poorest days. We prophesy that the time will come when certain divisions will operate no more than a night schedule on Sunday, if at all. All of this, however, has a favorable side. It shows that the business today is necessary to travel, and tends to put the street railway business in a place with lighting and water—public utilities. The only fly in the ointment is the auto bus. We believe that the street railway business can be carried on more cheaply than auto bus transportation. Certainly this applies to heavy traffic and rapid transit. That is to say, the efficiently operated urban lines have nothing to fear from the auto buses. When it comes to the suburban lines, the auto bus may have a distinct opportunity and we still feel —as we have in the past—that the wise street railway company will give bus service where it can be most economically given. Many street railways would be better off to-day if they had turned some of their carhouses into garages instead of stubbornly putting their heads into the sand and refusing to see the handwriting on the wall.

The street railway is an ideal "cash and carry" business. Its entire factory product is sold out every twenty-four hours—and accounted for "C. O. D.," or rather "Pay-as-you-enter." It has no heavy merchandise inventories to carry over in a declining market. It has no bad accounts to charge off. The very conditions that place a staggering load on industry—and cause the investor to be wary of industrial offerings—will add to a continuing reduction of its operating costs and should make for increased operating efficiency. Its labor, where placed in full and true knowledge of operating conditions, has shown a disposition to be reasonable. Every new economy has proved itself and come to stay. On the lighter traveled routes, some almost miraculous results in turning costly "feeders" into revenue producing lines are, as yet, slightly appreciated. Fundamentally, conditions are right for attracting capital to the street railway as a medium of investment. The vital problem is to get right—and stay right—with the public.

The downfall of credit was due to neglect of the ethical factor. With the cheapness of electricity as compared with mule motive power, the idea was publicly accepted that you could carry "anybody, anywhere, any time for a nickel." Evidence of the spread of this is found in the repeated appearance before the Connecticut legislature of one Cowles with a bill to make a uniform 25-cent fare on steam railroads between intrastate points. The trolley promoter seized on this to sell the investor "capitalized hopes." When public regulation of capital was tried, as in Massachusetts, it was circumvented by the "holding company," or voluntary trust which could issue without limit.

The "construction company" graft was another method of fattening the promoters' pockets. Financing the entire cost by bond issues, sold to remote investors, with the resultant species of absentee landlordism and self-perpetuating management, was an attendant evil. Credit for these diluted issues was sustained by dividends paid out of maintenance. When the inevitable reorganization came the absentee bondholder was given securities based on "reproduction cost, new," for a property which was not new, but worn out. They capitalized not only "unexpired franchises" but city pavements, that belonged to the tax-payer and the constant repair of which was a liability.

When the remaining 90 per cent of the mileage is operated as efficiently as 10 per cent now is, street railway securities will come back to their own. Take, for instance, the use of the one-man car. In the case of the Eastern Massachusetts Street Railway system, which is now operating about 800 miles, 92 per cent of the cars are one-man cars; but hardly 5 per cent of the total street cars of the country are one-man cars. Street railway men who continue the two-men cars say that their situation is different from other situations and the one-man car is impossible. A close examination, however, shows that this is not the case. If the Eastern Massachusetts can operate 92 per cent as one-man cars, certainly the entire street railway system of the country can operate an average of 75 per cent instead of 5 per cent. The one-man car is not only a saving in labor but also a great saving in power and maintenance.

Great possibilities exist in connection with the revision of union rules on roads operated by union men. Such a revision is wholly possible if the men are approached in a proper way. The elimination of the seniority rule and the proper settlement of discipline cases adds greatly to efficiency and hence ultimately to income of the men and of the company. The wage paid is immaterial compared with the care taken by the men, their industry, honesty and desire to develop trade. Time is coming when every street railway company will have courses in salesmanship for their platform men. Many companies have done wonders in reducing operating expenses but there still are great opportunities in devising means of increasing traffic. The future of the business demands making every platform man a salesman. It may be feasible to pay platform men a commission on the business they do.

The old idea that track and equipment has a life of only ten or fifteen years is wrong. By the use of light cars, creosoting ties and poles and welding of joints this life is being extended for perhaps twenty-five or thirty years. We expect to see every street railway joint in this country welded. Yes, and we expect to live to see many other things done which we have for years been told were impossible.

Working under Chairman Loring of the board of trustees of the Eastern Massachusetts Street Railway Company is wonderful training for any man. He has done so many things and introduced so many economies which street railway experts claimed to be impossible that it has made us believe almost anything possible. As he says: "As we trustees had never been in the street railway business, we did not know enough not to try the 'impossible' things. As a result, we are spraying our cars with paint instead of using brushes, cleaning them with exhaust air instead of by hand work, and keeping accounts with but 20 per cent of the clerks we formerly had."

The right road for the street railway is the prodigal's road back home. As an investment, it is being, and will be, rehabilitated whenever and wherever it is operated as a local community enterprise for the public good—for service and not for promotion profits. It needs:

1. Service at cost—with the sliding scale of fares and, possibly, wages as related to dividends.
2. The local board of control with all books open to car rider and employee alike, showing the results of the local operating unit.
3. Customer ownership.
4. Increased stock equity.
5. Gradual amortization of debt—by reducing obligations at maturity, instead of refunding with an increase.
6. Willingness on the part of the management to do what the dyed-in-the-wool street railway expert has said is impossible.

Police Traffic Regulations of New York City*

Traffic Organization Outlined—Address Urges Standardization of Traffic Signs and Signals and Says Time Is Opportune for Co-operation in Highway Traffic Regulation

By John O'Brian

Inspector Traffic Division, Police Department, New York, N. Y.

OF ALL the varied problems confronting the civic authorities of congested centers the traffic problem is paramount. We meet it at every turn. It has become as inevitable as the tides, and with the natural growth and prosperity of the country it is ever increasing in volume and adding to its complexities.

It is of such importance that it affects directly taxation, real estate values, commercial enterprises and the welfare of the community. Its growth has been stupendous and efforts toward regulation and control have not been entirely effective, possibly because the problem has not received the attention and concerted action of the civic and commercial interests involved.

We all have our traffic problems back home and in many respects they are very similar. In the city of New York we also have our own traffic problems. They are not only unique in many respects but in volume are overwhelming.

ORGANIZATION OF TRAFFIC DIVISION

For the purpose of traffic regulation, there is in the Police Department a Traffic Division, which embraces the five city boroughs and includes all streets and highways, the East River bridges as well as Central and Prospect Parks.

The city is divided into precincts and subdivisions, each in command of a captain. At the present time there are 1,547 members of all ranks, including foot, mounted and motorcycle men, assigned to traffic duty.

The foot patrolmen are stationed at street intersections, bridge approaches, bridge roadways, ferries, pier entrances and in the vicinity of the railroad terminals and are used mostly to regulate and facilitate pedestrian traffic while in the roadway. Mounted patrolmen are used to regulate vehicular traffic at piers, and on streets or avenues where congestion exists in the middle of the block, thereby co-operating with the traffic foot patrolmen at the street intersections.

The motorcycle division is particularly effective in enforcing traffic regulations as to speed, lights, improper turns, signals, license plates, licensed operators and chauffeurs, etc. This squad, with a force of 114 patrolmen, during the year 1920 served 61,835 summonses for infractions of the regulations, and for these violations the offenders were fined $767,960. Of these summonses served, 16.94 per cent were upon operators of passenger vehicles, 26.98 per cent on commercial vehicles, 36.16 per cent on taxicabs, and 10.52 per cent on motorcycles.

During this period 294,137 motor vehicles of all kinds were registered in the metropolitan district, and I think the number of summonses served will indicate a fair percentage of activity.

In the city of New York there are more than 30,000 street intersections, but it is in the borough of Manhattan, which by reason of its layout, about 3 miles wide by 12 miles long, with its enormous permanent and transient population and its varied business interests, that the problem is most acute.

When it is considered that a single hour's delay in the movement of merchandise or of commodities essential to existence in every-day life results in an enormous financial loss and the inconvenience of thousands of citizens, the importance of traffic regulation is readily apparent.

During the past three years, the city has been most fortunate in having an administration which has taken a most active interest in traffic conditions. It has perfected and put into effect regulations which a few short years ago would have been considered too drastic to be contemplated. I refer particularly to the laying out of route streets; that is, setting aside certain streets exclusively for passenger vehicles and others exclusively for commercial vehicles. This regulation has greatly facilitated movement and given general satisfaction.

One-way streets where thoroughfares are parallel have also been found to be most effective in preventing congestion and minimizing fire hazards, though affording an unobstructed passage though these streets for fire apparatus.

MECHANICAL MEANS OF TRAFFIC CONTROL

Another innovation in traffic control to which I invite your attention on your next visit to New York is the mechanical control of traffic now in operation on Fifth Avenue between Twenty-third and Sixtieth Streets. This system of lights and signals was devised and installed by Special Deputy Commissioner John A. Harris. It is so positive in control and so readily understood and observed by pedestrians and operators of vehicles that it frequently happens that its control is almost perfect in operation during the absence of patrolmen assigned to duty at the various crossings. If this system of control was extended to other crossings it would obviate in many instances the necessity of assigning a patrolman to so many street crossings.

As the traffic problem is a universal one, its control will only be effective by a standardization of regulations and signals. A step in this direction was taken during the month of May, 1921, at the National Police Conference, at which were representatives of police departments of 325 important nationwide municipalities in forty-five states, convened in the city of New York. At this conference Richard E. Enright, Police Commissioner, New York, advocated that a national system of traffic control be worked out, that the co-operation of the states be solicited and that a uniform method of operation, speed and signals be agreed upon.

Traffic regulations to be effective must control. The control must be positive, and to permit any deviation, except in extreme emergencies, would be to nullify the regulation. Control is maintained by observance, admonition and penalties for infractions of the regulations.

When approaching a discussion of standardization of traffic regulation, it is well to keep in mind that what is wanted is to simplify and build up from a basic standard, so as to remove annoyance caused by a maze of regulations, often conflicting one with the other, with resultant confusion.

STANDARD SIGNS AND SIGNALS ESSENTIAL

All signs, stanchions and lights should likewise be standardized as to design, color and use. Methods of signaling should be uniform. The great need today is a standard regulation that will make clear to a driver what is expected of him. If we can make it easier to do the right thing than the wrong, the final solution of the traffic problem will be at hand. In the large cities traffic problems are practically alike, and there is little doubt that a standard system could be formulated.

In any discussion of the subject of standardization careful consideration must be given to the commercial vehicle. This type of vehicle is ever increasing in size and weight and some restriction will eventually have to be placed upon its size and weight.

From 1915 to 1919, inclusive, the State of New York expended $21,062,066 for construction and $25,231,314 for maintenance of state roads outside of New York City. This outlay of money, while well spent, and accruing to the benefit of all citizens, cannot continue to increase at the present ratio without resultant tax burdens. The matter of permissible wheel loads should be standardized in all states. As for the matter of size of commercial vehicles, this is of more particular importance to city authorities where thoroughfares laid out long before the motor vehicle was dreamed of simply cannot accommodate the enormous motor truck without congestion, inconvenience to pedestrians and to business interests.

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*Abstract of address presented at the annual convention of the American Electric Railway Transportation & Traffic Association, Atlantic City, N. J., Oct. 3-6, 1921.

The matter of safety is of first importance, and despite all the literature that has been printed and distributed and the warnings and devices that have been perfected to prevent accidents, the number of personal injuries and fatalities continues to increase year aftr year, until now it surpasses the fatalities occurring on the entire steam railroad service of the country. All blame, however, cannot be placed upon the vehicle operators. We cannot relieve the burden of caution from the pedestrian to exercise due care, and when the pedestrian is guilty of negligence accidents will occur, despite all precautionary measures taken by the operator. As to the reckless driver he can only be corrected by penalty, adequately and positively administered.

As children are most often involved in street accidents, they should receive first attention. Proper playgrounds and recreation centers must be provided for them. They must be taught the absolute necessity of caution when on the highways. They should be as familiar with the rules of the road and their own local traffic regulations as they are with the simple rules of hygiene which they are taught and so rapidly absorb. This task is not an impossible one and co-operation between departments of education, police departments and children's welfare organizations intelligently conducted will bring splendid results.

The time is now opportune for the better co-operation and co-ordination between the police departments of the various cities, the traction interests, the automobile interests and highway associations to bring about standardization of traffic rules and regulations. It is to such organizations as yours that police departments look to for co-operation and assistance in the solving of the various traffic problems as well as minimizing street accidents.

The results gained from experience by the Police Department of the City of New York is at the disposal of all interested persons. Advice will be freely given for the asking.

Correct Method of Purchasing Railway Supplies*

Definite Standards of Measurement by which Various Competing Articles Can Be Compared Will Simplify Purchase and Sale

By H. B. Doyle

Of Philip Kobbe Company, Inc.,
New York, N. Y.

H. B. DOYLE

THE electric railways buy enormous quantities of equipment each year. The salesmen of equipment and supply houses each year sell an equally large volume. From the salesman's point of view he has made a sale. From the point of view of the railway official he has made a purchase. Buying and selling are so closely linked together that it is often a problem whether the transaction has been a selling one or a buying one. All purchases of any kind are the result of comparing values and probably no two men compare values in the same manner, and no two salesmen offer their wares in the same manner.

Your committee has been good enough to ask me to talk on the subject of the K-V standards. These can be equally well called the K-V standards of selling, the K-V standards of buying, or the K-V standards of comparison, for their only purpose is to simplify a purchase or a sale by setting up a definite measuring block with which competing articles can be properly and fairly compared.

"K-V" is a name given to this method of buying and selling as a mark of identification. It is copyrighted by the company which I represent, and is only used by companies whose standards of comparison have been developed and worked out in conjunction with us. "K-V" is my company's guarantee that the standards are fair.

The care and exactness with which a comparison is made is in a direct ratio to the importance of the article under consideration and to the amount of money involved in its purchase. It is possible that in buying railway supplies and equipment, there is room for a more exact weighing of values *before* specifications are written. In any given field there cannot be more than one article or item which is actually the best (assuming of course that the conditions under which it is used are identical or similar) and yet, those of you who are operating traction companies under similar conditions are undoubtedly buying a given kind of product from many manufacturers. That is what makes competition possible. But it is also true that not all of you can possibly be buying *the best.*

DUTY OF THE MANUFACTURER

It is clearly the duty of the leading manufacturer of any given line of equipment to help you purchase intelligently and correctly. Not only is it his duty but it is to his advantage. And modern selling is all along the line of actual service to the purchaser. I think it is clearly the duty of the man who has something to sell to analyze the factors that go into his article and to impartially evolve a method of purchase which can be presented to you for your approval (or disapproval) before the actual article is submitted. In other words, until the manufacturer, as the seller, and you, as the buyer, agree on a fair method of comparison, both you and the manufacturer are at a disadvantage. Neither of you has established a preliminary measuring block by which values can be justly compared.

For instance, take bearings. There are many makers of armature and axle bearings but it is inconceivable that all these bearings are of equal value. And yet all of them have some recognition on your various roads. If there *is* one best bearing for a given purpose, there also must be one best way of comparing bearings so that the one which is actually the best will be clearly revealed. When we analyze this we find that you are really buying the service that the bearing will render at a given cost. Therefore, some of the factors to be considered in a comparison are factors invisible to the naked eye and not subject to a physical test.

The finest bearing in the world at the cheapest price is of no value until it is delivered. And unless the manufacturer is substantial and responsible there is no guarantee that you will continue to receive your bearings promptly on delivery dates over a long period of time. Another point, or let us say another "standard," might be the location of the manufacturer. It is possible that a manufacturer of even a better bearing might not be the best one to deal with if his plant were located so far away that orders and shipments were unduly delayed.

The composition of a bearing varies not only according to the specifications of a road but also according to the skill and honesty of the maker. As you well know, an alloy may contain scrap metal and probably will contain hard and soft spots as well as some particles of iron which result in the scoring of the axle.

Another consideration is that of taper. Does either outside or inside diameter vary at either end more than six-thousandths of an inch? It is basic that bearings should not taper, and yet they do. The manufacturer and the railway buyer should determine and agree upon a set of measurement standards which will take in not only the physical features of a bearing but all the other features which are represented by overhead and price. The argument which occurs between the salesman and the buyer should not be an argument on the merits of a given article but on the prime factors that enter into the article. When these factors are agreed upon, no competing manufacturer of merit need fear to have his product examined.

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*Abstract of address presented at the annual convention of the American Electric Railway Engineering Association, Atlantic City, N. J., Oct. 3-6, 1921.

Several prominent railways have stated that they will give consideration to any equipment or supply house that is ready to discuss and agree upon a *set of standards* under which their product will be submitted and examined. We believe that any manufacturer offering his goods in such a manner should have consideration.

Make Your Safety Drive Continuous*

An Energetic and Systematic Public Safety Campaign Reduces Injuries, Increases Production by More Efficient Operation and Teaches the Great Value of Human Life

By Britton I. Budd

President Chicago, North Shore & Milwaukee Railroad

IN INDUSTRY we find that a concentrated effort to reduce accidents keys up those concerned to the highest tension for the period and reduces the number of accidents materially. But does it pay? At the end of the drive the impressions gained wear off and we are again back in the old rut. If we can concentrate on safety for a short time and obtain results, why not make it a systematic and co-operative drive for 365 days in the year and obtain these results every week instead of for only one or two weeks of the year. It can be done; safety work in industry has proved it.

To educate the employee we find that we must first educate the employer, for in safety, as in other things, the attitude of the employee toward the work is dependent on the attitude of the employer. To accomplish this object the employer must show the employee that he is behind the safety movement heart and soul; that any recommendation that may be made by the employee tending to reduce or eliminate hazards and to establish safe working conditions is closely investigated and if found practicable is carried out. The employer must establish an efficient first aid system to care for employees who may become injured and must see that all injuries, no matter how slight, are given proper treatment immediately.

B. I. BUDD

In an examination of the reports of the injured and killed we find that in 1920, out of 82,000 fatalities, 15,000 were children under fifteen years of age. What have we done to prevent the report for 1921 being a duplicate of that of 1920, or, in fact, what measures have we taken to prevent this list from being doubled this year? The number of autos on our streets has already increased 30 per cent over last year, and automobiles were the cause of a great number of these deaths. An energetic and systematic public safety campaign throughout the country is the only way we can accomplish our object. We must reach the public at home, on the streets and in business; in fact, the prevention of accidents must be brought home to the citizens of our country at every turn; they must not be allowed to forget it for an instant.

The establishment of safety instruction in our schools will give us a firm foundation which will not only bring results during the present generation but in the generations to come. The instruction of the children has begun on a small scale in many schools; in some it consists of periodical lectures and in others a half hour or an hour a day is being given over to this instruction. The older children have been given instruction in accident prevention at street crossings and in some cities have acted with the police department as traffic officers at the crossings during the hours that the children are going to and coming from school. In the instruction of children the effect of the word don't on the average ones results in their doing the very thing they have been warned against, while if they were told what they must do to accomplish a certain thing the result will be much more satisfactory.

The public safety work is in its infancy and to succeed must have the support of the management of the industrial plants who are experienced in safety work. It is just as much a part of their work in the upbuilding of the community to make it safe to walk the streets of their city as to make their shop or factory a safe place to work. With this support and with the chambers of commerce, clubs and civic organizations, police departments, boards of education, Boy Scouts and the general public, it is certain that we will make a material reduction in the list of preventable deaths and injuries.

SAFETY ORGANIZATION IN CHICAGO

The Chicago Safety Council operates as a department of the Chicago Association of Commerce, in conjunction with the National Safety Council. Its sole purpose is to make Chicago a safer city. Its activities are divided into four major divisions, known as public safety, industrial safety, railroads and public utilities and business administration.

The plan of the Public Safety Division, as shown in the progress report issued by the council, is as follows:

"1. On the committee composing the Public Safety Division are representatives of the homes, industries, churches, schools, women's clubs, civic bodies, city, county and state authorities, insurance companies, automobile clubs and all other organizations which have an interest either in the prevention of accidents or the education or prosecution of those who violate laws designed to safeguard vehicular traffic. This group of representative citizens, who have banded themselves together for the purpose of accident prevention, is already making its influence felt in an aroused public sentiment against the careless and many times inexcusable accidental deaths and injuries which occur altogether too frequently.

"2. Under this division there is a police and traffic committee, which is co-operating with the city and park police and the public generally in educating motorists in particular to have proper regard for enforcement of traffic laws and regulations. It is also developing plans for educating motorists in safe driving by means of bulletin boards installed at filling stations, garages, etc.; to conduct a school for chauffeurs and truck drivers, with a definite course of six lessons in safe driving, rules of the road, mechanical operation, etc., and to operate a school for women automobile drivers.

"3. The women, homes, churches, schools and colleges committee of the Public Safety Division has undertaken as its most constructive immediate function the matter of having safety instruction made a part of the curriculum in public schools and parochial schools.

"4. It also is preparing to carry on safety in the homes by means of distribution of illustrated bulletins describing the many home hazards. This subject is being presented to the women's organization of the city and it is contemplated that safety will be given due consideration by the clergy in their sermons from time to time.

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*Abstract of paper contributed to the discussion of the report of the joint committee on safety work at the annual convention of the Transportation & Traffic and Claims Associations, Atlantic City, N. J., Oct 3-6, 1921.

"5. Another arrangement about to be launched by the highway safety committee is one by which its reporting members will report to the safety council any dangerous practice or condition coming to their attention, including violation of laws and rules by motorists and others. These men will have neither insignia of any kind nor authority to stop or arrest violators, but reports made by them will be taken up with the offenders and an earnest appeal made for their assistance in the elimination of accidents. The plan provides for education and co-operation rather than prosecution, except that prosecution may be resorted to in extreme cases."

With the co-operation of the members of this association in a concentrated public safety campaign, along the lines of the National Safety Council's plan, the citizens of our great country will be brought to realize the value of human life and the necessity of exercising care and caution, which is a duty each and every individual owes to himself and to his fellow man.

Traffic Regulations and Safety Work*

Greater Responsibility Rests with the Driver of an Automobile than with the Pedestrian—Number of Persons Injured by Automobiles Appears Large, but It Is Very Small Considering Number of Machines

By J. M. Quigley

Chief of Police, Rochester, N. Y.

MY INFORMATION concerning automobile accidents has been gained from study of such occurrences which have happened on the streets of Rochester, N. Y., and whatever conclusions I have settled upon as to responsibility were reached after a careful and impartial study of the subject, with the object of finding out, if possible, a way to prevent accidents and make safe the streets of our city for all who may and have a right to travel them.

Webster defines an accident as that which happens without any known cause. According to that definition what proportion of automobile casualties can be classed as accidents. I will venture to say not more than 8 per cent. A careful investigation of such happenings invariably reveals a cause. An analysis of the cause of so-called accidents as revealed by the records kept in our office is as follows:

	Per Cent
Walking into side of, and running in front of automobiles	30
Reckless driving	10
Collisions	12
Crossing street not on crosswalk	8
Crossing street on crosswalk	6
Losing control of auto	5
Children playing in the street	3
Getting on and off street cars	3
Intoxicated persons	1⅓
Speeding	1
Collisions with street cars	2¼
Defective brakes	2

None of these come about accidentally. If the working of the mind of the operators involved could be known, it would be discovered that a forewarning had preceded the occurrence, but haste and recklessness challenged and they proceeded and took a chance, with the usual result.

J. M. QUIGLEY

Safety of person is more important than commerce or rapid transportation and it must not be subordinated to either. The operator of an automobile on the highway has equal rights with those traveling on foot but each must observe reasonable care for the other's safety, determined from the extent of danger incident to the use by each respectively.

Xenophon P. Huddy, in his work "The Law of the Automobile," writes interestingly and logically on the relative danger of persons traveling on foot and those traveling in vehicles on the highways, as follows: "The pedestrian class is the weakest of all others which use the public streets and thoroughfares. Those who travel in vehicles are protected to a more or less extent against actual personal contact with other objects on the public thoroughfares. Consequently there is advantage taken of the inequality of the situation. Naturally a pedestrian will flee in order to avoid injury, no matter whether he had at the time a legal right to hold his ground.

If the drivers of automobiles and other vehicles fully realized the seriousness of their conduct when the right of way of the pedestrian is not respected, and if the common law would be enforced, there would be a marked decrease in the accidents which happen on the public highways."

The driver of a vehicle, whether it is an automobile or a horse-drawn carriage, if he is guilty of inattention to his duty, may be criminally responsible for any death which his vehicle may cause at the time. For example, if he is driving an automobile while holding conversation with a companion and not looking ahead to see who may be on the highway. Under such circumstances, if he should kill a child, he would be guilty of manslaughter.

From these opinions the conclusion can be drawn that the greater responsibility is upon the driver of a vehicle. Reverting to the causes of accidents in which persons were injured or killed, it will be observed that the large number were said to have walked into the side of or in front of the automobile, making it appear that the pedestrian was negligent in every instance. A careful scrutiny of the reports of the investigators of these occurrences, however, compels us to attribute the cause to carelessness on the part of the driver of the automobile for the reason that, moving quietly as it does without the noise which accompanies the movement of a street car or a horse-drawn vehicle, the pedestrian is unaware of its approach. He steps into the street and is struck; not because the pedestrian was careless or incautious, but for the reason that the automobilist did not exercise that caution necessary to be obtained when traveling a thoroughfare upon which he should reasonably be prepared to anticipate such an occurrence.

AUTOMOBILISTS ABUSE THEIR ADVANTAGE

An automobile traveling at the rate of twenty miles per hour moves seven times as fast as the average pedestrian, or in other words it will travel one hundred feet in the same space of time that a pedestrian will travel fourteen feet, or about one-third the width of the average city street, so that when the pedestrian stepped from the curb the automobilist was far enough away to warrant the foot traveler to believe that the driver, exercising due circumspection, would stop or slow down the movement of his vehicle and give way to the pedestrian. Anyone observing automobile travel will note that the driver of the vehicle almost invariably attempts to force the pedestrian to hasten out of his way.

During the year 1920 a total of 2,139 automobile accidents were reported to the police of Rochester. Of them, 812 were accidents in which 906 persons were injured and 21 killed. Of persons injured, 196 were passengers and 710 were pedestrians. Of the total number of accidents, the character of the vehicles involved were, pleasure cars 999; light deliveries, 168; trucks, 90; and taxicabs, 70. Of the accidents in which persons were injured, the character of the automobiles involved were, pleasure cars, 609; trucks, 100; delivery, 68; and taxicabs, 35.

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*Abstract of paper presented at the annual convention of the American Electric Railway Transportation & Traffic Association at Atlantic City, Oct. 3-6, 1921.

The locality in which these accidents occurred with relation to the center or congested section of the city, 144 occurred in the business or congested district; 301, outside the congested district but within the mile circle; and 461, outside the mile circle. Three of the fatal accidents occurred in the congested district, ten outside of the congested district but within the mile circle and eight occurred outside the mile circle. You will note that the greater number of accidents occurred at points remote from the congested district, which goes to show that they occurred where the drivers of vehicles and pedestrians also feel most secure from danger, and too, it indicates greater carelessness of both pedestrian and drivers in the outlying districts.

ACCIDENTS ARE FREQUENT AT INTERSECTIONS

Another important phase of the accident problem is the location on the street where they occur, of the 2,139 reported, 1,153 happened at street intersections, and 986 elsewhere. Four hundred and thirty-six persons were injured in accidents occurring at street intersections and 470 in those that happened elsewhere.

Though the automobile accidents are more numerous than they should be, yet, when we consider the number of automobiles traveling the streets daily the proportion of accidents to the number of automobiles is very small. There are 36,274 automobiles owned by persons living in Monroe County, N. Y., and all of these are operated on the streets of Rochester at one time or another. This being the fact, and, too that but 2,139 automobile accidents were reported, it is readily apparent that only a very small proportion of drivers are careless or reckless; to be specific, 6 per cent. This, in my judgment, is a very creditable showing, but we can and must make a better showing. We have by experiment and practice demonstrated that accidents can be prevented, and that by extending the preventive measures now used, their number can be further reduced.

Are we then going to permit this most useful vehicle because of its misuse by the few incompetent or reckless operators to become the modern "Juggernaut"?

Picking Men for Jobs in the Transportation Department*

Six Principles Based on Employment Practice in Other Fields Are Suggested as Useful in the Selection of Transportation Employees

By Henry H. Norris

Managing Editor
ELECTRIC RAILWAY JOURNAL

THE report of the committee on personnel and training of transportation department employees is to be commended from several considerations. In the first place, it has been prepared with definiteness of purpose, its scope is reasonable, and the committee has evidently had in mind the formulation of guiding principles rather than detail of practice. The second feature of this report is its brevity. In its few pages, however, there is condensed a wealth of suggestion. In the comments which follow the topic of the selection of employees will be considered from the analytical point of view. Having had no personal experience in employing men for the transportation department of the electric railway, the writer can give only the results of his observations, combining with these some suggestions based on a general study of modern methods of employment in other fields. The attempt has been made to formulate certain guiding principles, which will be phrased in concise form.

HENRY H. NORRIS

Principle I.—The selection of employees is so important a function that it should be intrusted only to the most competent man available.

This principle requires no argument. It has not always been recognized, however. In the manufacturing industries it is now being stressed mightily, the war having given the impetus to increase in production efficiency through skilled selection of workers.

In selecting employees the electric railway employment department has two things in mind, in addition to the desire to fit a good man to a good job. First there is the ambition to keep down the labor turnover. The second is the possibilities of the applicant as a transportation salesman. How quickly and completely will he come to be at ease in the performance of his duties? How promptly can he store his mind with the facts and principles of the business so that he will be able to give patrons the information which they desire? How quickly can he become skilled in that essential function of the modern platform man, "selling the service?"

These questions suggest the statement of another principle, namely:

Principle II—Selection of employees on the basis of quality is infinitely more important than the purchase of materials to specification.

There was a time a few years back when it was impossible to choose carefully among applicants because there were not enough applicants to go around. Now we can begin to look for this quality of salesmanship, regarding which so much has been said but so little done. Obviously merchandising transportation involves merchants, or salesmen, so that the following principle applies to this aspect of the electric railway business with great force:

Principle III.—The qualities which in other lines of business enable a salesman to sell are needed in the platform man, particularly the conductor.

These qualities are declared by the committee to include "personal appearance, bearing, manner of answering questions, and ability to carry out simple instructions promptly and correctly." A great deal can be learned by studying an applicant carefully with these points in mind. But in doing this it is not enough to look a man over and guess that he is all right or otherwise. If a quality is worth desiring it is worth testing as far as testing is practicable. This is all that the much advertised, and rightly advertised, intelligence tests do; that is they measure things that were formerly determined by guesswork. To put this more concretely:

Principle IV.—Snap judgment is not safe now, and never was safe, in the selection of employees.

Suppose the committee's suggestions as to rating considerations in elimination tests of electric railway transportation employees be listed, in the following manner:

1. Personality: (a) personal appearance, (b) bearing, (c) manner of answering questions.

2. Mentality: (a) Ability to execute simple instructions promptly and correctly, (b) mental alertness, (c) judgment.

The candidate cannot, of course, rate himself by answering questions, except as to matters of fact. Snap judgment by the employing officer is just as bad; but what is to take its place? This leads to:

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*Abstract of paper presented as part of the discussion on the report of the committee on personnel and training of transportation department employees at the convention of the American Electric Railway Transportation & Traffic Association, Atlantic City, N. J., Oct. 3 to 6, 1921.

Principle V—If personal and mental qualities are to be considered at all in selecting employees, some kind of objective analysis should be made.

No absolute scale of rating in the qualities listed is possible. On the other hand, some people undoubtedly answer questions better or carry themselves better than others. In other words, qualities can be compared with each other even when they cannot be compared with a standard. This is really what is needed, for the purpose is not to pick out paragons, but rather to select the best among a group of applicants. For example, as a test for rating personal appearance, the following is suggested:

Consider men in groups of ten at a time, including in each group say two employees who are satisfactory but not remarkable. Make a list of these men, arranged in order of merit. Get some one else to do the same independently. Compare notes. Repeat the process for the other qualities. Combine the results so as to get a general scale of rating for the group. An experienced personnel man believes that in such a rating scale the best man may easily be five times as good as the poorest.

To make the matter more specific, such questions as these should be kept in mind in rating for personal appearance: (a) Is the applicant well proportioned? (b) Has he the appearance of good character and habits? (c) Are his clothes carefully selected and neatly kept, and his shoes polished? (d) Does he show reasonable care in the preparation of his toilet; hair brushed, nails clean, face shaved, etc?

These questions are simply the application of the committee's suggestion that personal appearance be considered. If it is to be considered at all, it should by all means be considered in reasonable detail.

The questions which might be asked in connection with the bearing of the applicant would include: (a) Does he carry himself well? (b) Does his bearing suggest courtesy? (c) Is he pleasant without being servile? (d) Is he alert and active in manner? (e) Does he look like a real man's man?

As to the manner of answering questions, these queries may be suggestive: (a) Do his oral answers show thought? (b) Does he meet your eye in answering oral questions? (c) Are his oral answers complete but concise? (d) Is he reasonably quick in giving either kind of answer?

While these questions may seem trivial and unnecessary, are they not of the type that one unconsiously has in mind in judging the personality of another? If so, then they may well be formulated. This is what was done on such a large scale by the celebrated army tests, from which electric railway men can learn a lot that will help them in their business. In fact, it may properly be said here that:

Principle VI.—While freak "psychology" should be avoided in selecting employees, modern science should not be ignored.

The matter of personality has been gone into in some detail, to illustrate the principle of rating which is applicable to it. The subject of mentality, as broached by the committee, opens up a still wider field for comment. All that can be done here is to outline a few essential features. Mentality can be rated much more definitely than personality. Possibly the army tests, suitably modified, may be found useful in electric railway work. They are being applied in other branches of industry.

The committee's requirement of "ability to execute simple instructions promptly and correctly" lends itself to objective testing admirably. For example, it can be gaged by: (a) Manner of filling in the application form. (b) Manner of applying for the medical examination. (c) Manner of performing some elementary feats with the rule book.

Science has definitely proved that mental alertness can be tested with reasonable accuracy. At the same time the men should not be asked to do any "fool stunts" which would appear ridiculous to them.

In addition to mental alertness, the quality of judgment is also susceptible of rather accurate measurement, but for the present purposes it can be gaged fairly well from the data already gathered.

In the foregoing outline attempt has been made to apply the magnifying glass to a small but highly important section of the committee's report. To carry out the committee's suggestion to a logical application involves more study than has been given to the matter so far. With the approval of the executive committee it might be well for a future committee on this subject to investigate such matters as the following:

(a) To what extent are psychological tests being used in the transportation departments of electric railway properties, and with what results?

(b) In what ways might such tests profitably be used?

(c) What tests could the committee itself make along this line, and what records should be kept that would be of real value to the industry?

(d) What standards, if any, could be recommended, and what procedure might be followed in determining the personal and mental qualities which are desirable in employees of the transportation department?

Finally, the writer wishes to reiterate what he has said regarding the importance of intelligent selection in employment work, preferably with some kind of a rating scale. In going over this matter with a practical psychologist the writer was urged to stress this point in discussing the committee report.

He cited the case of an insurance company which was selecting a manager. One applicant was well known and well liked by the directors. A rating scale showed the directors and the applicant himself that he was not the man for the job.

There is another element in this careful rating of men. If a promising man turns out not to be fitted for the duties of the transportation department, he may be just the one for some other position in electric railway service. Some manufacturing concerns have a rule that when it is necessary to refuse employment to an applicant, the refusal shall take such form as to leave the man in a friendly frame of mind. Nothing will do this better than to show a helpful interest in finding him a place to which he is naturally adapted.

The Banquet

A DEPARTURE from recent custom was the banquet, which occurred Wednesday evening in the Renaissance Room of the Hotel Ambassador. About 800 in all were present, including many ladies.

After the dinner the first speaker was President Gadsden, whose topic was "Salesmanship in Transportation." An abstract of his remarks appears elsewhere in this issue.

The second speaker was Prof. J. Duncan Spaeth of the department of English at Princeton University and the coach of the varsity crew. After describing many of the advantages of electric railways as a transportation medium Professor Spaeth gave an inspirational address on the reasons for success in large undertakings. He urged the use of the law of things in dealing with equipment and the law of men in dealing with men. To secure service and power these two fundamental laws must be joined.

The dinner was followed by informal dancing and music in the Venetian Room at the Hotel Ambassador.

Election by Accountants

THE sessions of the American Electric Railway Accountants' Association will be reported in next week's issue. The following officers were elected for the ensuing year:

President, Frederick E. Webster, vice-president and treasurer Massachusetts Northeastern Street Railway, Haverhill, Mass.

First vice-president, W. G. Nicholson, secretary and auditor Omaha & Council Bluffs Street Railway, Omaha, Neb.

Second vice-president, E. M. White, treasurer Binghamton (N. Y.) Railway.

Third vice-president, W. A. Doty, auditor Denver & Intermountain Railroad, Denver, Col.

Secretary-Treasurer, F. J. Davis, auditor's department, Public Service Railway, Newark, N. J.

For members of the executive committee, J. J. Duck, general auditor Chicago Surface Lines; R. N. Stevenson, chief clerk to comptroller, the Connecticut Company, New Haven, Conn.; Wallace L. Davis, auditor Lehigh Valley Transit Company; G. H. Caskey, auditor Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va.

Proceedings of the American Association

The Constitution Offered by the Executive Committee Was Adopted After a Few Changes Had Been Made—More than 1,200 Were Present—Exceptional Group of Financial Papers Presented—Hoover Sends Message on Interdependence of Railways and Other Industries.

THE first session of the American Electric Railway Association was called to order at 9:50 Tuesday morning by President Gadsden, who without further introduction gave the presidential address. He first told about the defalcation at the New York office and the action taken by the court in the case of the defaulter, Gibson. In this connection he said: "I want to take this opportunity to say that after the strictest investigation, the result of our consideration of this subject convinced me, and I am satisfied convinced the other members of the special committee in charge of the matter, that our ex-secretary, E. B. Burritt, was free from any moral complicity in that matter. In view of his long association with us and of the high esteem in which we held him I think it is due to him that I should make that statement to his friends here assembled." He also explained the arrangement made by the court by which the defaulter will endeavor to pay back the sum taken.

Continuing, President Gadsden said that when this situation became apparent, the executive committee, instead of making drastic reductions in the service of the association or cutting down the payroll, determined at first to make a thorough investigation of its own affairs. Some reductions were made in expenditures, but a more important step was the determination to consider whether the association as at present organized was the best possible fitted to solve the questions being thrust upon it. A reconstruction committee was appointed and made a most exhaustive and painstaking inquiry into every phase of the parent association and those affiliated with it to determine what steps should be taken for improved future conditions.

In the opinion of the speaker the fundamental weakness of the organization, as disclosed by the research of the reconstruction committee, was the fact that the association was not, in fact, being conducted by its officers, but the custom had grown up for the executive committee to meet only on the call of the president, and then only to consider some special or emergency matter. Hence the most important change in the proposed constitution is the provision that the board of directors—the executive committee—meet monthly. There has been some criticism of the provision that the association could not get the kind of men it wanted if they would be obligated to attend a meeting of the board once a month. The speaker's answer to that was that that is the practice followed in the two other public utilities associations, the gas and the electric associations. If a man can be made to feel in accepting a position on the board that he is actually taking part in the management of this great industry of ours the position will be sought after. In the judgment of the speaker as much depends upon the periodic monthly attention of the board as on anything else.

PHILIP H. GADSDEN
Retiring President

The speaker then discussed briefly a number of the questions which were to come up at the meeting, particularly in connection with the report of the reorganization committee. One of these was whether a municipally owned property should be eligible for membership. Another was a clause providing that the executive committe shall have power to admit to membership in the association transportation companies other than the electric railways, which include trackless trolleys and motor buses. The speaker said he hoped this topic would be thoroughly discussed. He also said he wished to emphasize another phase of the committee's report, namely, the question whether the work being performed by the magazine of the association, *Aera*, was essential or could not better be performed by the technical press. Statements, he said, have been made also that the advertisements in *Aera* were not obtained on their merits, but that they were largely influenced by friendship or by a mild species of sandbagging; that is to say, that the manufacturers were held up, and that, therefore, the money spent in advertising represented a duplicate expenditure on the part of the industry, unnecessary duplication, and therefore a waste which ought to be stopped.

Continuing, the speaker said that the question has sprung up perennially, and as it is obvious that the association cannot continue to run a magazine and make it effective as a magazine or successful financially if every year the question of its continued existence is brought up for serious debate and consideration, therefore the reorganization committee requested the *Aera* advisory committee to make a further report covering all phases of the question. The speaker said that he had approached this subject rather in sympathy with the view that *Aera* as now conducted was not justifying itself, but after careful consideration of the report of the advisory committee he became thoroughly convinced, as did, so far as he could recall, every member of the reorganization committee, that the magazine was performing a necessary and useful service to the industry. Moreover, to his surprise, the committee had statements made to it by numbers of manufacturers that so far from looking upon the advertisements of the magazine as a holdup, they considered it one of the best mediums for advertising that they knew of. Hence the committee recommended that the magazine should be continued and the speaker hoped that this would be considered final.

The speaker then took up matters external to the association and said that he would refer particularly to two phases of the problem. For over ten years, he said, the electric railway industry had been held in slavery to a fixed 5-cent fare. The public and the companies, ever since the establishment of the street railway industry, had been worshiping at the shrine of the nickel. But at last the industry, along with all other business in this country, has come to a point where it is recognized by the public that the price of the electric railway ride must bear a definite relation to the value of the service to the car rider. That is of tremendous importance to the industry. The roads, in some isolated cases, may go back to a 5-cent fare, but only because it is justified under the conditions which may exist at that time. The fetish of the 5-cent fare has gone forever in this country.

That is what has happened to one of the fixed ideas in the mind of the public. Another was that once a street railway was built and put into operation it could never cease to run. Once a railway, always a railway. The public recognized that if a textile, metal or a shoe factory or an automobile concern could not sell its goods at a profit it would close down, but in some mysterious way the public got an idea that the street railway was immune from the operation of economic laws and would keep on operating notwithstanding the fact that its cost increased and it was unable to get an adequate fare. The situation in Des Moines has destroyed that illusion. For more than thirty days a city of over 126,000 inhabitants has been without facilities of street railway service. The result is that at no time over 50 per cent of the travel that used to be handled by the electric railways has been handled by any system of transportation in the city of Des Moines except for a week when the fair was held, when the return to the company was guaranteed. The balance of the people either had to stay at home or walk. The result to the merchants of the town has been simply disastrous. Recognizing how important this demonstration at Des Moines was to this industry of ours, the association arranged that Mr. St. Clair should go to Des Moines, and he spent three weeks studying that situation and sent out from Des Moines re-

Secretary-Treasurer's Report

AMERICAN ELECTRIC RAILWAY ASSOCIATION
BALANCE SHEET, SEPT. 30, 1921

Cash	$15,800	
Investments	600	
Furniture and equipment	4,957	
Emblems	556	
Paper	651	
Petty cash at New York	750	
Petty cash at Washington	100	
Accounts receivable	9,979	
Public relations fund		$1,991
Committee on national relations		2,416
U. S. mail pay committee, 1920		*1,174
National committee on public utility conditions		*356
U. S. mail pay fund, 1921		1,162
Notes payable		15,000
Surplus		14,437
	$33,476	$33,476

*Deficit.

INCOME STATEMENT
Eleven Months Ended Sept. 30, 1921

Revenues

Admission Fees		
Railway companies	$60	
Manufacturing companies	70	
		$130
Annual dues		
Railway companies	127,351	
Manufacturing companies	20,873	
Individuals	2,137	
		150,362
Miscellaneous income		
Interest on deposits	$463	
Interest on investments	31	
Sale of Year Book and Proceedings	82	
Sala of Engineering Manual and binder	322	
Sala of bibliography on valuation	....	
Sala of miscellaneous pamphlets	1,000	
Sale of service at cost	194	
Sale of dinner tickets	6,240	
Contribution from Hotel Men's Association	4,082	
Discount on purchases	149	
Convention dinner, 1921	1,572	14,139
		$164,631

Aera

Advertising	$15,665	
Subscriptions, railway companies	4,120	
Subscriptions, manufacturing companies	1,353	
Subscriptions, individuals	1,448	
Subscriptions, company section members	1,726	
Paid subscriptions	434	
Sale of extra copies	64	
Sale of binders	76	
		24,899
Total revenues		$189,530

Expenses

American Association	$124,331
Engineering Association	4,271
Transportation & Traffic Association	1,109
Accountants Association	873
Claims Association	811
Aera Association	35,705
Total actual expenses	$167,101
Defalcation	73,017
Total expense as shown	$240,118

SUMMARY OF ESTIMATED INCOME AND EXPENSES FOR YEAR ENDING OCTOBER 31, 1921

Surplus as of Sept. 30, 1921	$14,437
Estimated receipts for October	13,500
Total income for year	$27,937
Estimated expense for October	19,000
Estimated surplus at end of year	$8,937

EXPENSES OF AMERICAN ASSOCIATION
Eleven Months Ended Sept. 30, 1921

Salaries of general office staff	$40,762
Rent of office and storerooms	5,237
Stationery and printing	22,067
Postage	3,045
Office supplies and expenses	1,271
Telephone, telegraph and messenger service	2,590
Express, freight and cartage	156
Traveling expenses of secretary and office staff	762
Expenses of standing committee of American and affiliated associations	148
Printing of association publications:	
A—Advance paper, proceedings, Year Books	2,029
B—Engineering Manual	....
C—Service-at-cost plans	....
D—	....
E—	....
F—Other publications	855
Miscellaneous association expenses	13,474
Expenses of mid-year dinner:	
A—Mid-year dinner expenses	7,060
B—Other mid-year meeting expenses	3,252
Expenses of annual convention (current year):	
A—Exhibit expenses	....
B—Entertainment and other convention committee expenses	20
C—General convention expenses	143
Expenses of annual convention (prior years):	
A—Exhibit expenses	....
B—Entertainment and other convention committee expenses	....
C—General convention expenses	10,004
Written off to profit and loss	....
Sundry adjustments to accounts receivable (uncollectible, etc.)	1,487
Total	$114,369
Salaries and expenses of Washington representatives:	
A—Salaries	5,608
B—Rent	1,414
C—Expenses	2,938
Total	$9,961
	$124,331

EXPENSES OF AFFILIATED ASSOCIATIONS
Eleven Months Ended Sept. 30, 1921

Engineering

Printing of association publications:		
Advance papers, proceedings, Year Book	$3,549	
Engineering Manual	182	$3,731
Expenses of committees		524
Miscellaneous		15
		$4,271

Transportation & Traffic

Printing of Association publications:	
Advance papers, proceedings, Year Book	$978
Expenses of committees	95
Mid-year dinner expense	35
	$1,109

Accountants

Printing of association publications:	
Advance papers, proceedings, Year Book	$750
Mid-year meeting expense	123
	$873

Claims

Printing of Association publications:	
Advance papers, proceedings, Year Book	$785
Expense of committees	15
Miscellaneous	10
	$811

EXPENSES OF *AERA*
Eleven Months Ended Sept. 30, 1920

Salaries of *Aera* staff	$10,475
Rent of office	678
Telegraph, telephone and messenger service	625
Postage and express, office	152
Traveling expenses of *Aera* staff	1,116
Miscellaneous *Aera* expenses	737
Magazine expenses:	
A—Cost of printing	18,506
B—Cost of paper	1,729
C—Cost of cuts	1,167
D—Mailing charges	449
E—Express, freight and cartage	....
F—Envelopes for mailing	67
Total	$35,705

ports to the various committees of publicity throughout the United States.

As long as the public was under the delusion that whatever happened, irrespective of the cost of operation, irrespective of the fact that platform wages had gone up 100 per cent, that taxes had gone up 40 and 50 per cent, in short, notwithstanding any abnormal increases of operation that might be laid upon a company it had to operate at a nickel, why should it be interested in solving the railway's problems? Street railway men must realize that some day, when conditions justify it, they will not be able to escape the demand for a decrease in the charge for transportation, but before serious consideration can be given to that proposition there must be a substantial liquidation in the cost of labor in the street railway industry.

In view of the community of interests which exists between the car rider and the companies the latter properly can call upon the communities which they serve to support them in a proper and legitimate effort to get this wage scale down to a point which will permit this industry to function.

The speaker then called attention to the activities of the Committee of One Hundred, whose work he considered as absolutely essential to the furtherance of the interests of the association. Yet the committee reports that only 56 per cent of the companies have responded favorably to the appeal of the committee for support. This indicated to the speaker that there must be something radically wrong with the viewpoint of some of the managers.

REPORTS OF EXECUTIVE COMMITTEE AND SECRETARY AND TREASURER

The report of the executive committee was then read. It was ordered filed.

Mr. Welsh then read the reports of the secretary and treasurer. The latter is given in the tables on page 610.

The secretary's report described the activities of the association and the work done at headquarters for the association year. The mid-year dinner and conference, held at Chicago on Feb. 10, 1921, was first mentioned, after which the defalcation which caused the resignation of the former secretary was taken up.

In the emergency which arose in view of the above disclosure, President Philip H. Gadsden gave his undivided attention to the work of the association for a considerable period and, together with the auditor, M. R. Boylan, actively directed the prosecution of the case and otherwise personally investigated the entire conduct of affairs at association headquarters. A number of meetings of the executive committee were held during this period for necessary authorizations in connection with these matters.

A committee on reorganization was authorized to study the association's form of organization, the methods prescribed for carrying on its various activities, a revision of the constitution and by-laws, the efficiency of the headquarters staff in executing the work of the association and to recommend a permanent secretary.

A sub-committee was appointed to redraft the constitution and by-laws, consisting of H. V. Bozell, Harlow C. Clark and the acting secretary. As a result, there will be presented to the convention a revised constitution and by-laws and a series of general recommendations on current matters. The reorganization committee also recommended the appointment of J. W. Welsh as secretary to be effective as of July 1, 1921, and this recommendation was later confirmed by the executive committee.

Attention was called to the work of the affiliated associations, particularly to that carried on by the standing committees of the engineering association. In the Transportation & Traffic Association will be found a series of reports bearing on the vital current problems of economic operation and service to the public.

The most notable activity of the association during the year was the formation of the advertising division of the bureau of information and service, under the direction of Labert St. Clair, who is well known to members of the association. This important work was made possible by the active financial campaign carried on under the auspices of the Committee of One Hundred.

The association has maintained during the year its Washington office under the direction of Charles L. Henry, chairman of the committee on national relations. Mr. Henry has found it necessary to devote considerable time to this work as numerous matters of national legislation have been pending.

The association has taken out membership in the National Safety Council and is co-operating with that organization, through its Transportation & Traffic Association, in the furtherance of safety work.

The association also continues to be a member of the National Industrial Conference Board and has furnished the membership with information relating to general industrial conditions, such as the cost of living, financial and labor statistics, etc., as compiled by that board.

Through its engineering association, the development of engineering standards in a national way is now proceeding under the auspices of the American Engineering Standards Committee. This work is carried on in connection with the principal national engineering societies of other industries, and as both the manufacturers, the consumers and disinterested engineers are represented on all committees, it is believed that the standards so effected will be both practical and acceptable to all concerned.

The association is also a member of the Federal Highway Council, which is considering broad questions of adequate facilities for highway transportation and suitable regulations for highway traffic.

As a result of approval by the executive committee at its Chicago meeting, the committee on mail pay was authorized to solicit the financial assistance of member companies handling mail and to exercise its judgment in the application for increased rate before the Interstate Commerce Commission. Funds have been solicited from member companies, and the report of the committee indicates that progress has been made.

The general publication policy of *Aera* has been maintained this year as heretofore. During the year there were published 108 special and contributed articles and 174 questions with 1,104 answers in the Question Box. The advisability of continuing the magazine was again suggested as a possible means of reducing expenses, but at the request of the president the *Aera* advisory committee submitted a further report on the subject, and as a result the reorganization committee recommended the continuation of the present policy to the executive committee.

One new company section has come into association membership. This is the Camden Section of the Public Service Railway. Special credit is due to Martin Schreiber, who was a most active supporter of this form of association membership.

The association's record for membership is most encouraging, there being a net loss of only two small railway companies. In the case of the manufacturer companies some of the smaller companies whose membership was largely due to the annual exhibit have been withdrawn. The net loss in this case is fourteen, making a total loss of sixteen companies during the year.

Unfortunately, the committee on membership has not been able to carry out the program which it planned after the mid-year conference, due largely to its desire to await the report of the reorganization committee before making an active campaign for membership. That the association has been able to hold its own under these trying circumstances is considered of especial significance and most encouraging for next year's prospects.

As a result of the loss of the association's funds and in response to an appeal from President Gadsden, a very drastic curtailment was made in the operating expenses of the association. Consideration, however, was given to the necessity for maintaining the essential functions of the association's service to its members, and the economies effected are believed to have been accomplished without any material abridgement in this respect. Briefly, these consisted in reducing the association's force, including the publicity department and the Washington office, from thirty-nine to thirty employees; abandonment of additional office space contracted for adjacent to the present quarters, as well as the abandonment of outside storehouse facilities, closer supervision in the use of office materials and supplies, reduction in the postage, telephone and telegraph accounts and the curtailment in the number of circular letters and questionnaires. In addition economies were effected in the publication of *Aera*, largely by a more efficient mechanical set-up.

The work of the bureau of information and service continued to increase even above the phenomenal record made last year. The average number of monthly requests for information was 810, as compared with 545 last year. This made a total of 9,718, as compared with 6,532 in 1920, an increase of 49 per cent.

DISCUSSION ON REVISED CONSTRUCTION

President Gadsden then said that the next order of business was a discussion of the proposed revised constitution and by-laws, and as he desired to enter into the discussion he asked Vice-President Todd to take the chair. At the request of Chairman Todd, Mr. Bozell of the reorganization committee then gave an account of the work of the reorganization committee and explained that the first clause of the constitution permitted members to make changes in the proposed constitution from the floor, this clause to become inoperative after the 1921 convention.

W. H. Sawyer, president East St. Louis & Suburban Railway, explained that during the revision of the constitution he had probably opposed more measures in the revised draft than any other three members of the committee. Nevertheless, he moved that the recommendations of the executive committee be adopted in their entirety. The association, he said, was faced with the necessity of adopting some constitution, and the executive committee had spent much time on this work. While he did not believe that the constitution was as good as it might possibly be made, it was a thoroughly workable constitution, and it permitted changes to be made in it without great difficulty. He believed it would simplify matters at the present meeting to adopt the constitution as drafted as many parts were correlated and it might be difficult to change one without affecting other parts.

A general discussion then followed as to the method of procedure to be followed and the plan was finally adopted that it would be acted upon clause by clause.

The most extended discussion related to whether carriers other than electric railway companies and electrified sections of steam roads should be admitted to membership. The argument in favor of this plan was principally that many railway companies were now considering the use of buses for auxiliary and supplemental service, and the admission of bus companies into membership would allow the association more fully to study the situation and bring to the membership at large all the information and experience available in this form of transit. The principal argument against the admission of such companies was that a wrong impression would be produced by the action, people thinking that the railway companies had lost faith in the value of the trolley car for urban and interurban service and were planning to abandon it in favor of the bus.

One speaker, arguing in favor of the second view, said that a bus manufacturer had recently sent out a circular descriptive of his bus and included the statement that "eminent authorities had agreed that electric railways had been relegated to the past." He thought that the proposed action by the association would confirm this impression. At the same time there was general agreement that the bus would be used by electric railway companies to a considerable extent in auxiliary and supplementary service and several speakers have declared that there are already plans for such use.

The decision finally reached was that such companies would not be eligible to membership, the point being brought out that this clause could be changed at any time in the future when a change seemed desirable.

Following the discussion on buses, the next point which was raised in modifying the proposed constitution was to eliminate the provision that an executive committee member could be represented by proxy and also the next provision that an executive committee member would automatically lose his office if absent for three consecutive meetings.

With these changes and with one or two slight corrections in wording the entire constitution and by-laws as revised were adopted.

The association also approved the recommendations of the reorganization committee as to certain questions of policy or practice. These were outlined in the ELECTRIC RAILWAY JOURNAL, July 16, page 105. In the same place and in the issue of Aug. 13, page 249, are outlined all the changes in the constitution which were considered, so that with the report above and these previous two reports a complete picture of the new constitution is had.

At this point President Gadsden announced certain committee appointments. As a substitute for P. S. Arkwright, Atlanta, Georgia, who was not present at the convention, Charles H. Harvey, Knoxville, Tenn., was appointed on the nominating committee. The committee on resolutions was named as follows: P. N. Jones, Pittsburgh, chairman; E. B. Wisner, St. Louis, Mo.; H. V. Bozell, New York; H. H. Aiken, Philadelphia, and B. J. Fallon, Chicago. The appointments on the committee on recommendations in the president's address were as follows: Edward Dana, Boston, chairman; G. W. Jones, Brooklyn, and Harlow C. Clark, Newark, N. J.

Following this the report of the *Aera* advisory committee was read by Charles L. Henry, chairman, and is abstracted herewith. The reaching of other committee reports scheduled for this session was dispensed with because of lack of time. This disposition included the reports of committees on membership, company sections.

AERA ADVISORY REPORT

The committee has found the year now closing a very busy one. Early in the year the apparent necessity for a reduction of expenses was brought before the committee by the president of the association with a request that so far as practicable, without injury to the magazine, the expenses of this publication be cut down. With a view to doing this various economies were instituted, resulting in a saving of approximately $700 per month. The necessity for an acute retrenchment referred to having passed, the convention number of *Aera* has resumed its former completeness.

After the executive committee had appointed what was afterward known as a reorganization committee, with a view to making recommendations regarding any changes in the management of the affairs of the association, this committee was asked to report to the reorganization committee its views regarding the publication of *Aera*. In compliance with that request, this committee made a full report to the reorganization committee concerning the publication of the magazine, of which the following quotation is a complete summary:

"We would make *Aera* a bigger and better magazine in every respect than it has ever been, understanding, of course, that this cannot be done between sun and sun, but must be done day by day, week by week and month by month."

Notice was taken of various suggestions made in different ways and at different times and by various persons concerning certain features of the publication of the magazine, none of which the committee deemed necessary to put in its report. The report was presented to the reorganization committee, which accepted the report as presented.

Notwithstanding the general business depression, the volume of advertising in the October issue of the magazine is the greatest it has ever had. The committee looks forward to the carrying out of the wish expressed in its report, and that with the help of all concerned this association will have a better and greater magazine. The report is signed by Charles L. Henry, chairman; Myles B. Lambert, Edwin C. Faber, Martin Schreiber, Charles C. Peirce, R. E. McDougall, A. M. Robinson and I. A. May.

SERVICE-AT-COST FRANCHISES

After the completion of the reading of this report Edward Dana presented a paper on "Contrasted Advantages of Service-at-Cost Contract Franchise and State Regulation," which was followed by formal discussion by Robert I. Todd and S. B. Way. These are published elsewhere in this issue.

In the discussion Walter Jackson reviewed the principal features of two new contracts entered into during the past year in Paris. The first of these involved the purchase and consolidation of seven or eight systems purchased by the Department of the Seine, giving public ownership, but turning the operation over to a private managing association. The credit of the companies was so bad that money needed for improvements was to be raised by the state. The state was also to assume any deficit from operation. The Department of the Seine exercises a most minute control of all the details to insure adequate service and proper expenditure of funds. Incentive to the management was provided in the form of a percentage of any savings effected not resulting from a lowering in the standard of service or the number of passengers carried. No such saving has been shared to date.

The other franchise referred to covered the underground railways, and this provided that the operating company should receive so much per passenger carried, thus providing a direct reward for the usefulness of the railway.

In this case also the state would make up any deficit and a reward to the management for making any saving in operation was provided, though none as yet has been shared. In this case the employees derive about 4 per cent of the earnings, which is divided so that the trainmen get twice as large a proportion as the employees not in contact with the public.

The meeting was then adjourned.

Wednesday's Session

The second session of the American Association was called to order, with President Gadsden in the chair, at 9:40 Wednesday morning. The first order of business was the report of the mail pay committee, which is published in abstract below:

MAIL PAY

Early in the year the committee requested and received from the executive committee authority to proceed with a new application to the Interstate Commerce Commission for further adjustments in the rates paid electric railways for handling United States mail. Preparations to this end were made and W. H. Maltbie of Baltimore was engaged as counsel.

Shortly after the new Postmaster-General was appointed we got in touch with Second Assistant Postmaster-General Shaughnessy and were assured of the co-operation of the department in preparing our case, to the end that if we could prove our rates were not justly compensatory, the matter could be submitted to the Interstate Commerce Commission for a decision. The department has agreed to co-operate with the committee in obtaining information by means of a joint data sheet and the submission to the commission of agreed facts, which should prevent the necessity for long hearings or the need of sending a committee around the country to take evidence.

We have submitted a proposed data sheet to the Post Office Department, and after going over it it in turn submitted to us a number of forms calling for the information it felt was necessary.

At the present time we have up with the department the welding of these suggestions into a joint data sheet, and as soon as agreed upon it will be sent out with a request for prompt attention on the part of electric railway companies.

The committee in presenting the previous case to the Interstate Commission requested, first, that electric railway mail carriers be relieved of side and terminal service and, second, that the actual carriage of the mail be compensated for on a count basis. The Post Office Department, on the other hand, requested the commission to place compensation upon a weight basis, to be determined by periodic weighings.

ROBERT I. TODD
Newly Elected President

The commission in its final decision relieved the roads of side and terminal service or, in cases where this was not entirely practicable, provided compensation therefor, although at a rate not entirely satisfactory to the committee, but rejected both the request of the committee for a count basis and the request of the Post Office Department for a weight basis and adjusted the compensation for electric railway mail carrying on a space basis, using 30 cu.ft. as a unit space excepting in independent cars, R. P. O. cars and R. P. O. apartments, in which the linear car-foot was adopted as the unit.

The committee has made no effort either in the evidence or on brief to present an independent study of the cost of rendering the service, both in view of the complexity of the problem and the very great difficulty, if not impossibility, of securing such data as would make an accurate cost determination possible. In lieu of such a determination we assumed as reasonable the prior rate at the time when it was first promulgated by the Post Office Department, and then pointed out both the increase in operating cost and the increased volume of mail carried as fully justifying rates higher than those requested by the committee. The Post Office Department, on the other hand, did present to the commission a brief study of the cost of rendering this service based upon certain data as to average operating costs per car-mile and average car length, resulting finally in the conclusion of the Post Office Department that the average cost per linear car-foot-mile, including all operating expenses and a return on property invested, was 7.66 mills.

This study, corrected at certain points where the commission considered the figures too low and translated from linear car-foot-miles into cubic foot-miles, formed the basis of the commission's final determination of costs.

Inasmuch as the theory of the Post Office Department, apparently accepted by the commission, fixed as fair compensation per linear car-foot-mile the cost of producing the linear car-foot-mile, it is equivalent to the assumption that all linear car-foot-miles produced are marketed, since otherwise compensation should be determined by distributing the cost of production over the portion of the product finally marketed. The committee has therefore been engaged in the collection of data on the subject of the ratio of passenger-miles to seat-miles and believes that it will be possible to establish before the Interstate Commerce Commission the fact that at the maximum the number of seat-miles marketed for the industry as a whole does not exceed 50 per cent of the seat-miles produced, or, in other words, that if pouch mail is to be treated as taking the place of passengers and paying upon the same scale as the passengers the price for linear car-foot-miles used should be at least double the cost of producing a linear car-foot-mile. This, and the increase of operating costs since the collection of the data submitted to the commission in the previous case, constitute the major points upon which the new case is to be based.

The committee has recently asked for definite authority from the individual electric railway companies, so that we can go before the commission as representing the industry specifically as well as at large. During the winter, a request was made upon companies handling mail to underwrite the expenses of the new case to the extent of 4 per cent of their mail revenue. The response to this request was not particularly encouraging. However, sufficient funds were guaranteed to enable the committee to go ahead with its work, and we anticipate that the total cost of our case will be met by contributions from those companies which have agreed to contribute, plus such aid as the association itself can extend.

Perhaps it is unnecessary to say that if, as a result of our further studies and investigations, we had not felt that

BRITTON I. BUDD
First Vice-President

there was a reasonable possibility of proving our right to an increase, the case would not have been reopened. The report was signed by L. H. Palmer, chairman; Gordon Campbell, Charles L. Henry, G. K. Jeffries, R. A. Leussler, Samuel Riddle, W. S. Rodger and C. L. S. Tingley.

The report of the publicity committee was next presented by Barron G. Collier, chairman.

PUBLICITY

The work of this committee during the past year consisted largely in organizing and directing the work of the advertising section of the division of information and service, created Jan. 1, 1921, by the Committee of One Hundred. The work of this section has been in the immediate charge of Labert St. Clair, a former newspaper and advertising man of wide experience, who handled the publicity of the Federal Electric Railways Commission hearings at Washington.

The broad general functions of the advertising section as determined upon at the outset were these:

To offer free suggestion, advice and counsel to all electric railway companies on their advertising and publicity problems.

To prepare and distribute to local companies car cards, leaflets, booklets, newspaper advertisements and other advertising material. (This material is so prepared that it may be altered to meet any local situation.)

To prepare varied series of bulletins on the electric railway situation for the use of speakers before chambers of commerce, rotary clubs and similar organizations; for distribution by bond houses, investment bankers and other institutions engaged in the sale of electric railway securities, and for utility managers to use as a means of promoting good will.

To issue press statements, news stories, speeches and articles of interest regarding the industry to the daily press, magazines and other publications.

To co-operate with state and national public utility information committees.

To act as a general clearing house between electric railway companies for the distribution of all advertising and publicity material which will be of mutual aid.

To make engagements for widely known speakers before national conventions and other large gatherings for the discussion of electric railway problems, and to co-operate with these speakers in seeing that they obtain facts upon which to base their addresses and that their remarks receive proper distribution.

To study the motion picture field in an effort to see what can be done to adapt it to use as an electric railway advertising medium.

During the first month of the section's life it was somewhat hampered by lack of funds, but this obstacle has now been overcome.

The section has been frank in its dealings with the press and has emphasized its desire to be of service to newspapers and periodicals. Whenever news of the industry arises a new story or statement is prepared in a form likely to meet the needs of the press associations and it is distributed by the director of the section. The committee reported a number of examples of important news stories prepared and handled by the section.

C. D. EMMONS
Second Vice-President

A noteworthy feature of the year's work was the inauguration of "Electric Railway Day." This was successful despite the fact that less than four weeks' notice of the proposed celebration, on May 4, was given the companies. It is hoped that this day, the anniversary of the inauguration of electric railway service in Richmond thirty-three years ago, may be the occasion of an annual celebration, locally if not nationally.

The section has also distributed, under the committee's direction, a large number of leaflets, suggested window signs, newspaper advertisements, and other forms of advertising. An advertising textbook entitled "Getting the Public Eye and Ear" was also prepared and distributed. Numerous other items of activity were listed in the report.

In conclusion, the continuation of the work of the advertising section was urged, special stress being laid on the financial needs of the industry. Co-operation was urged with state committees and local companies in an effort to get more public speakers to put the industry's message before the peo-

BARRON G. COLLIER
Treasurer

PAUL SHOUP
Operating Member-at-Large

P. S. ARKWRIGHT
Operating Member-at-Large

H. E. CHUBBUCK
Operating Member-at-Large

J. N. SHANNAHAN
Third Vice-President

ple and with the companies and the company section committee in preparing material for the education of employees.

The report was signed by Barron Collier, chairman; C. B. Buchanan, Britton I. Budd, W. A. Draper, C. D. Emmons, S. W. Huff, Horace Lowry and Lucius S. Storrs.

NOMINATIONS AND ELECTION

Following the receipt of this report, the nominating committee made its report through its chairman, John H. Pardee. The committee prefaced its actual nominations with a statement acknowledging the receipt of most useful suggestions from some of the members with reference to desirable candidates for office. The committee recommended that in future years, when the newly adopted provisions for the nominating committee are operating, all members should help the committee by making constructive suggestions, as is the intention.

The committee then presented the following nominations for office:

President: Robert I. Todd, president Indianapolis Street Railway and the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.

First vice-president: Britton I. Budd, president Chicago elevated railways, president Chicago, North Shore & Milwaukee Railroad and president the Chicago Interurban Traction Company, Chicago, Ill.

Second vice-president: C. D. Emmons, president United Railways & Electric Company, Baltimore, Md.

Third vice-president: J. N. Shannahan, president Newport News & Hampton Railway Gas & Electric Company, Hampton, Va.

Fourth vice-president: Frank R. Coates, president Community Traction Company, Toledo, Ohio.

Treasurer: Barron G. Collier, president Barron G. Collier, Inc., New York, N. Y.

Operating Members-at-Large: Terms to expire in 1922—Paul Shoup, president Pacific Electric Railway, San Francisco, Cal.; P. S. Arkwright, president Georgia Railway & Power Company, Atlanta, Georgia.

Terms to expire in 1923—H. G. Bradlee, president Stone & Webster Management Corporation, Boston, Mass.; H. E. Chubbuck, vice-president executive Illinois Traction System, Peoria, Ill.

Terms to expire in 1924—R. P. Stevens, president Republic Railway & Light Company, New York, N. Y.; W. H. Sawyer, president East St. Louis & Suburban Railway, East St. Louis, Ill.

Manufacturer Members-at-Large: Terms to expire in 1922—George H. Tontrup, president National Safety Car & Equipment Company, St. Louis, Mo.; Thomas Finigan, vice-president American Brake Shoe & Foundry Company, Chicago, Ill.

Terms to expire in 1923—Samuel M. Curwen, president the J. G. Brill Company, Philadelphia, Pa.; L. E. Gould, president Economy Electric Devices Company, Chicago, Ill.

Terms to expire in 1924—John G. Barry, manager railway department, General Electric Company, Schenectady, N. Y.; Charles R. Ellicott, eastern manager Westinghouse Traction Brake Company, New York, N. Y.

There were no other nominations and the meeting, by a unanimous vote, elected the above named nominees to office.

F. R. COATES
Fourth Vice-President

PAPERS ON FINANCE

There were three papers on electric railway finance by H. M. Addinsell, Harris, Forbes & Company, New York; F. E. Frothingham, Coffin & Burr, Boston, and J. K. Newman of Isidore Newman & Sons, New Orleans. Each of them approached the solution of the existing situation from a different angle, but all emphasized many of the same points. Abstracts of these papers are found elsewhere in this issue.

The paper on the comparative position of the traction industry today and four years ago by Edwin Gruhl, New York, who was unable to be present, was abstracted by Harlow C. Clark, Public Service Railway, New Jersey. This paper is given in abstract elsewhere in this issue.

RELATION OF MANUFACTURERS

E. F. Wickwire, Ohio Brass Company, presented a discussion on how the manufacturers of electric railway material could help the industry build up public opinion and incidentally its credit. An abstract of his remarks is published on another page. S. M. Curwen, the J. G.

W. H. SAWYER
Operating Member-at-Large

R. P. STEVENS
Operating Member-at-Large

GEORGE H. TONTRUP
Manufacturer Member-at-Large

THOMAS FINIGAN
Manufacturer Member-at-Large

Brill Company, also furnished a prepared discussion, which in his absence was read by Secretary Welsh.

Olin W. Hill, street railway expert of the Babson Statistical Organization, presented the paper on "Street Railways as an Investment" in the absence of Roger W. Babson. This paper in abstract will be found elsewhere in this issue.

Trackless Transportation

In reporting for the trackless transportation committee, H. B. Flowers, Baltimore, chairman, said that the committee had held three well-attended meetings during the year and had evidenced a keen appreciation of the importance of making a report, but was unable to do more at this time than to make a progress report. It was impossible to agree on any report which the committee was willing to sponsor, hence no report was prepared. Mr. Flowers made this comment particularly to correct an impression which he said had been current that the committee had prepared a report which had been suppressed. This was not the case. He recommended that a similar committee be appointed for the ensuing year and that it endeavor seriously to determine where the trackless trolley may be effectively and profitably used.

W. J. Harvie, chairman of the Committee on Electrolysis, then presented the report of this committee.

Electrolysis

After the publication of its last report, in 1916, the American Committee on Electrolysis was delayed in its activities during the war period, and early in the year 1919 the committee resumed its active work. The most active of the sub-committees has been the one on research, the work of the other sub-committees being in a considerable degree dependent upon the findings of this committee.

After the research sub-committee undertook to work in co-operation with the Bureau of Standards an important question of policy arose. Members of the research sub-committee, and especially the representatives of the American Electric Railway Association, considered that reports upon the conditions prevailing in particular localities should be limited to statements of fact without any expression of opinion as to what should be done to correct conditions. The members of the research sub-committee were of the opinion that there still existed considerable difference of opinion as to methods for mitigating electrolysis troubles and that until the committee had been able to agree upon the principles involved it was premature and unwise to express an opinion with reference to any particular locality. Furthermore, it was considered that in the absence of an agreement as to the engineering principles involved it would be unfair to the local utilities to express an opinion that might cause controversies or even litigation between such utilities. This policy has been strictly followed by the research sub-committee, working in conjunction with the Bureau of Standards in the course of its many investigations in the different cities throughout the United States.

Within the past two years the research sub-committee has conducted active field investigations in Memphis, St. Louis, East St. Louis, Kansas City, Denver and Cleveland. This sub-committee has devoted its attention particularly to the question of pipe joint electrolysis, for the reason that the efficacy of pipe drainage was very largely dependent upon the seriousness of joint electrolysis. Electrical surveys were made in all of the above cities for the purpose of determining the location of pipe joints of high resistance. Excavations to uncover these joints were made and the joints, together with the pipe for some distance on either side of the joint, thoroughly sand-blasted and a very careful examination made. All of the data so obtained were carefully recorded and in many cases include photographs. The committee arrived at the conclusion that joint corrosion does not take place where both sides of the joint are negative or neutral to the surrounding earth. The sub-committee was unable to agree as to the seriousness of joint corrosion. It is, however, the opinion of the representatives of the American Electric Railway Association on this sub-committee that the seriousness of joint electrolysis has been overestimated and that it does not constitute a serious objection to the use of pipe drainage. It has been the policy of the American Committee on Electrolysis and of its sub-committees to arrive at definite conclusions only by the unanimous consent of the different interests represented. There is naturally a difference of opinion with reference to the electrical drainage of underground structures as a mitigative measure.

It has not yet been decided whether or not the American Committee on Electrolysis will be continued in its present form. There is unquestionably a large amount of work to be done before the principles underlying the prevention of electrolysis can be finally formulated. It has been proposed to discontinue the main committee and to carry on the work through what is now the research sub-committee. In the report of this sub-committee, which is incorporated in the report of the main committee, there is included a program (as noted at the end of this report) of future investigations to be made by the research sub-committee in co-operation with the Bureau of Standards. Whether or not this program can be carried out depends upon the financial support that may be given to the committee by the various member associations.

The committee on electrolysis calls particular attention to the report of the American Committee on Electrolysis, which is now being printed and which will be ready for distribution in the near future. This report, although by no means final and complete, nevertheless represents an important contribution to the art. It merits the careful study of all electric railway engineers. The representa-

S. M. CURWEN
Manufacturer Member-at-Large

L. E. GOULD
Manufacturer Member-at-Large

JOHN G. BARRY
Manufacturer Member-at-Large

C. R. ELLICOTT
Manufacturer Member-at-Large

tives of this association, realizing the importance of the work of this committee, have taken an active part in all its deliberations, in the field work of the research sub-committee and in the preparation of the report.

Following is the program of future work recommended by the research sub-committee of the American committee.

1. Development of practical means for measuring current density across contact surfaces of pipes and earth. Such measurements are especially necessary if structures are not kept negative to earth.

2. Development of working means for determining the polarity of structures and adjacent earth in such a way as to eliminate galvanic effects.

3. Study of effect on underground structures of different values of voltage drop in the track and the effect on stray current from rails, including supposed large variation of this relation under different conditions.

4. Cost studies of street railway systems and different methods of power supply to determine the minimum values of track voltage drop consistent with economic operation.

5. Quantitative effect on insulating joints in protecting pipes and cables, assuming railway stray current at economic minimum.

6. Investigation of the distribution of current from pipe to adjacent earth for the purpose of determining whether a diversity factor can be established, *i.e.*, the relation between maximum and average current density.

7. Detailed study of the application and maintenance of such a drainage system as will keep all underground structures negative to earth, including study of the importance of corrosion of railway structures.

8. Comparison of (5) and (7).

9. Continuing study of joint corrosion.

10. Study of soil and galvanic corrosion, with particular reference to its bearing on the problem of corrosion by stray currents.

11. Setting limit of current on gas and oil pipes to avoid fire and explosion hazard.

12. Setting limit of current on power cables to avoid overheating.

The meeting then adjourned.

Thursday's Session

The first matter taken up at the meeting of the American Association Thursday morning was the report on national relations, which was read by Charles L. Henry, chairman. An abstract of this report follows:

NATIONAL RELATIONS

Soon after the last annual convention representatives of various railway brotherhoods presented to the United States Railroad Labor Board, then recently organized, applications involving some twenty or twenty-five electric railway companies of the country, seeking to have the Railroad Labor Board take jurisdiction of complaints concerning labor matters against the electric railway companies. The questions involved were of interest to all electric railway companies, and this committee immediately took up the matter with the United States Railroad Labor Board, calling in question the jurisdiction of the Labor Board to determine labor complaints against electric railway companies "not operating as a part of a general steam railroad system of transportation," and asked that preliminary to a consideration of any such cases those companies be given an opportunity to present to the Labor Board the question of jurisdiction.

The Labor Board granted this request, and for three days a very extended oral argument of this question of jurisdiction was had before the board in the city of Chicago. At this argument this committee appeared for all the electric railway companies of the country and a number of the companies also appeared personally for themselves. At the close of the argument our committee asked for, and was granted, leave to file a printed brief with the Labor Board on the matters involved and a few days later presented to the board its printed brief, copies of which were sent to all member companies of this association. Very much to the gratification of the committee, the Labor Board decided the question of jurisdiction adversely, holding that the exempting clauses in the transportation act of 1920 excluded from its jurisdiction all electric railway companies "not operating as a part of a general steam railroad system of transportation."

A renewed attempt, very vigorously pressed, was made to have Congress authorize the coinage of a Roosevelt memorial coin, coins of ½-cent, 2-cent, or 2½-cent denominations being suggested. As many electric railway companies had adopted what are known as recording fareboxes, which would, by the adoption of either one of the proposed new coins, require rebuilding so as to accommodate the new coins, the question presented was one of very great financial interest to those companies. It was found that the expense of thus rebuilding these recording fareboxes would involve an expense to the companies using them of between $400,000 and $500,000, and it was also feared that the rebuilding of the fareboxes to accommodate the additional coins would slow them down so as to render them practically useless on some railways where travel was very heavy. At a hearing held by the committee on coinage, weights and measures of the House of Representatives this committee appeared and, at the request of the chairman of the coinage committee, took charge of the opposition to the bill. The committee secured the co-operation of a large number of bankers against the coinage proposed. Mr. Brandt, president of the Brandt Manufacturing Company, which manufactures coin counters especially for the use of banks and similar institutions, and Mr. Johnson, president of the Johnson Farebox Company, both responded to the request of this committee to assist in the hearing. Since the hearing referred to no action has been taken in either of the houses of Congress on the coinage bills and the committee does not believe there is any danger of the enactment of the proposed legislation.

Many questions growing out of the provisions of the transportation act of 1920 have called for the attention of the committee before the Interstate Commerce Commission, and it has frequently appeared before the commission concerning such matters. The commission, however, has moved very slowly on all questions relating to the status of electric railway companies under the various provisions of the transportation act of 1920 and thus far has not promulgated any definite rulings of a general character concerning same.

In the case of the Petaluma & Santa Rosa Railroad this committee assisted the company in presenting its case to the Interstate Commerce Commission, which was decided by the commission on the specific facts concerning that company in the operation of its electric railway. After the decision was rendered the committee wrote to Commissioner Meyer of the Interstate Commerce Commission, who was chairman of the section having the question under consideration, that as a committee it would take no further action in the case. Two paragraphs from the letter to Commissioner Meyer follow:

> It has always been the contention of this association before your honorable body that the transportation act was remedial rather than regulatory in character and must be construed accordingly. It has also been our contention that in order to effect the purposes of the act the conditions of the carriers under it must be considered in each case, and particularly so with reference to inclusion or exclusion in or from section 15s. It is very apparent to us, and must be to you, that many electric roads would be seriously injured by being included in this section, while, on the other hand, there are undoubtedly electric roads the character or business of which not only logically brings them within the provision of this section but practically demands such inclusion.
>
> I wish to state in closing that the association will, of course, at all times, aid its members in properly getting their cases before your commission and in getting to your commission such information as you may desire.

The legislative questions involved by Senate bill 1874, a proposed amendment of the Clayton act and the interstate commerce act as well, has been delegated to a sub-committee composed of A. W. Brady, C. D. Cass and C. W. Kellogg (representing H. G. Bradlee of the committee). No legislative action has been taken on this bill, but the sub-committee is giving attention to it with a view that, if finally passed, it shall be in such form as not to injure our companies.

The transportation act of 1920 has raised many questions involving various companies of the association, many of which have been disposed of by correspondence.

Just recently a question has been raised with the Public Utilities Commission of the District of Columbia by the Washington Railway & Electric Company insisting that that commission does not have jurisdiction over it regarding depreciation charges and accounts, but that, being an interstate carrier, it is, in such matters, subject only to the jurisdiction of the Interstate Commerce Commission, under the provisions of sub-section (5) of section 20 of the interstate commerce act, as amended by the transportation act of 1920 and has asked the co-operation of this committee in presenting the questions involved.

The determination of this question of jurisdiction is likely to prove a matter of great importance to many of our railway companies. As now pending, it is somewhat local in character, but similar questions may arise, involving other companies, concerning the jurisdiction between state public service commissions and the Interstate Commerce Commission. The committee, therefore, feels that it should carefully look into all the questions involved and, after so doing, determine what should be its attitude concerning the same.

At the request of government officials connected with the work, this committee lent its aid in securing a proper appropriation to enable the Bureau of Standards to prosecute its field work on the subject of electrolysis, our association being represented on the joint committee acting with the Bureau of Standards in the investigation of this subject.

The Washington office of the association, at 949 Munsey Building, has been under the management of the chairman of the committee. Paul W. McGovern has had immediate charge of the office, and has, in the absence of the chairman of this committee, transacted for the association a large amount of business. A résumé of the matters is then contained in the report, which was signed by Charles L. Henry, chairman, and Arthur W. Brady, Henry G. Bradlee, Britton I. Budd, Lucius S. Storrs, Edwin C. Faber, C. L. S. Tingley, C. D. Cass and W. S. Rodger.

The report on valuation was presented by Martin Schreiber, chairman. In conclusion Mr. Schreiber said that a large number of letters commenting on this report had been received and that most of these were complimentary. In a few cases some criticisms were raised, but when further explanation was made by the committee these objections were withdrawn. The report was approved as presented.

VALUATION

The committee during the year devoted its time to the two questions recommended for consideration at the last annual meeting, namely, "rate of return" and "economical procedure for appraisals."

Under rate of return the committee presented a general economic analysis to prove that a "fair return" must be allowed or guaranteed This "fair return" is not determinable in advance, but is a function of the variable conditions in each case.

In approaching the general question of the rate of return which should be allowed to a public utility the committee discussed the factors affecting the flow of capital into any given line of business. It pointed out the fluctuations of capital flow as dependent on production, competition and profits. The committee pointed out then that, left to itself, business is regulated not so much by competition for customers as it is by competition for capital. If prices are excessive in comparison with cost, capital flows in and lowers them; if prices are low in comparison with cost, capital refuses to flow in and even flows out until the shortage of production brings about an increase in price.

The committee then proceeded to discuss the control of monopolies, showing that there is a dual standard for controlling monopolies, some being controlled by economic laws alone, while "public utilities operating under economic law, are put also under the direction and control of public utility commissions, which fix maximum rates for the product which these utilities offer for sale."

The committee then argued that there is no justification for the "exceptional treatment of public utilities," but concludes: "The committee would offer no protest against the regulation of the public utility. It is pointing out merely that the attempt to confine regulation of price to public utilities as a class has neither a historical nor a logical foundation."

A commission may desire to allow a satisfactory return, but its mere allowance of a return which it deems sufficient may not attract capital. The investor's mind determines whether his money goes in or not, and the practical fact is that the community which offers reward below the standard of the owners of fluid capital will not continue to receive adequate public utility service. The committee then pointed out that a rate fixed below the standard set by the investing community naturally leads to overbonding on the part of the utility; this merely aggravates the stock-issuing difficulties and tightens up the financial situation.

The committee then analyzed the views of the common stockholder and shows what he must have, indicating the change in stock quotations in recent years due to the low rate of return realized.

In its conclusions the committee covered these same points in different language. It then makes perfectly clear that it did not desire this report to be considered as opposing regulation, *per se.*, but merely an attempt to point out the dangers confronting the industry and the civic communities served by the industry if the rate of return is not adequate; in other words, if the rate of return is not such that new and additional capital from new investors will readily flow into the industry.

Finally, the committee said: "By the phrase 'adequate rate of return' we mean a rate of return such as will encourage a reasonable inflow of new capital from new investors. If the rate of return allowed does not do this, it is unquestionably inadequate, and the communities served will suffer all out of proportion to any possible minor gain through temporary lower rate of fare, for over a period of years the industry can better serve any community, at a lower rate of fare, if given adequate money for improvements."

Under the heading "Economical Procedure for Appraisals" the committee showed how past detailed methods of valuation entail the expenditure of considerable time and money. It pointed out that the accuracy of these detailed methods is probably no greater than some more general method which would consider types of construction with minor variations as basis for making large units to price. In other words, if railways with good property records will get together with the authorities it should be possible to determine upon a certain number of "yardsticks" corresponding to the various classes of property shown on the company records, and these company records can be made the basis of the valuation, any objection to their use on the part of any interested parties being made by affording to these interested parties full opportunity for such check inspection of the property as will determine the accuracy and adequacy of the records in question.

The committee then proceeded to show what is meant by this, listing the following types: (a) Types of track, (b) types of overhead construction, (c) types of equipment, (d) types of buildings reduced to cubage, (e) types of bridge and culvert construction, (f) type of pavement and foundation, and other similar types.

The committee recognized a certain amount of error, but says this would be no greater than that accompanying present methods. To show that this plan has not been confined merely to theoretical discussion, it pointed to the determination of the cost of reproduction new of the physical property of the Connecticut Company used and useful for the public service, substantially along these lines. (See ELECTRIC RAILWAY JOURNAL, May 21, page 947 and May 28, page 985.) The committee concludes that the progress of the art is such that in all future appraisals member companies shall attempt to secure:

1. Series of conferences between all of the parties interested in the appraisal to the end that there shall be an agreement as to the methods to be followed in the making of the inventory and in pricing.
2. That this agreement should cover the adoption of a minimum number of "yardsticks" or types to the end that the inventory may be rendered as simple as is consistent with equity to both parties.
3. That the prices of these "yardsticks" should, so far as possible, be fixed by agreement between the interested parties, falling back upon detailed study of construction only in those cases where agreement proves impossible or records incomplete.
4. That, wherever possible, overheads and intangible value shall be determined in like manner by agreement, resting upon the records of other appraisals which have met with the approval of regulatory bodies and the courts, modified, in those cases where such modification is demanded, by local conditions and the experience of the conferees.

The committee recommended that the next year's committee continue the detailed study of the above recommendations upon economical procedure for appraisals. The report is signed by Martin Schreiber, chairman; C. W. Gillespie, W. H. Sawyer, Williston Fish, J. H. Hanna, H. C. Anderson, Cecil F. Elmes and W. H. Maltbie.

SAFETY-CAR OPERATION

The report of the committee on safety car operation was next presented by R. P. Stevens, chairman. The following is an abstract.

The committee feels that its inquiry should be limited to safety car operation as a matter of general company policy. It has considered the subject from the viewpoint of public opinion, legislation, commission regulation and labor relations. The committee suggests the uniform use of the term "safety car" to designate all types of car operated by one man and equipped with adequate safety devices. Cars of older types rebuilt for one-man operation but lacking adequate safety devices cannot properly be described as safety cars.

In August, 1921, there were 5,500 one-man cars in operation in the United States. Of this number 4 300 were standard safety cars and 1,200 were converted former two-man cars.

This number of safety cars and safety devices on the former two-man cars, as well as the double tracking, turnouts and carhouse facilities incident to operating this equipment, represent an investment by the electric railway companies of about $50,000,000.

Not a single negative reply was included in the 122 answers received to the question of the one-man safety car being satisfactory to the public as to both quality and safety of service, although four were doubtful. Furthermore, as to opposition by public bodies, either city or state, to one-man safety car operation there were at the date of this report but two such cases pending in the whole country.

As regards safety of operation, experience has shown that on the basis of carefully kept accident records the one-man safety car, equipped with the standard safety devices, shows fewer accidents, and a lower cost of settling accidents, per 1,000 car-miles than the average two-man cars. The following figures show the result of experience in 1920 with one-man safety cars by seventeen companies carrying 246,642,000 passengers in eleven different states:

	Type of Car		
	One-Man	Two-Man	Total
Total car-miles operated	19,727,000	17,406,000	37,133,000
Total passengers carried	113,777,000	132,865,000	246,642,000
Total accidents	7,282	9,406	16,688
Accidents per car, 10,000 miles	3.69	5.40	
Total cost accidents	$291,620	$279,920	
Average cost per 1,000 car-miles	$14.77	$16.06	
Decrease in accidents per 10,000 car-miles			31.7 per cent
Decrease in accidents per 100,000 passengers carried			9.6 per cent
Decrease in accidents cost per 1,000 car-miles			8.03 per cent

The success of one-man safety cars in improving the accident situation is particularly striking when viewed in connection with the rapid growth in vehicular street traffic during the last few years while the one-man safety cars were being introduced. The total number of automobiles in the United States has grown from 2,424,000 in 1916 to 7,904,000 in 1920, an increase in four years of 226 per cent.

One-man operation has also proved satisfactory from the operator's point of view. As one-man car operation was inaugurated by introducing only a few cars at a time, the normal labor turnover prevented any man from losing his job, and the trainmen like the job, not only because it pays more money but because the work is more interesting. A great deal also has been done to facilitate the performance of the operator's duties, such as the use of registering fare boxes, air-operated transfer registers, simplification of reports, sale of metal "tokens" or tickets off the cars, and turning in of transfers only twice daily.

Where the principle of one-man operation has been applied to large double-truck cars, with the installation of adequate safety devices, the car is fully as safe and satisfactory as the small, light-weight safety car. Experience shows that the large double-truck, one-man car has fewer accidents from collisions than the light safety car, because, with its greater weight, the operator does not feel like taking chances with it, nor do the drivers of motor vehicles have the contempt for its size that they do for the smaller vehicle. All but two of the fifty-four replies received on that subject state that double-truck cars can be run by one man with the same degree of safety as by two men.

As the rate of fare paid by the public must be sufficient to cover the cost of furnishing a street car ride, the public benefits from one-man operation because the labor cost is reduced. The employee benefits because he is able to earn a higher rate of pay with one-man operation.

There are now no laws on the statute book of any state prohibiting the oper-

The Banquet at the Ambassador Hotel

THE ASSOCIATION THIS YEAR REVIVED THE PRACTICE OF HOLDING A BANQUET AT ITS ANNUAL CONVENTIONS ation of street cars with one man. Bills proposing to prohibit one-man operation have been defeated by the legislatures of eleven states. Fifteen state public service commissions have approved one-man car operation. Numberless cases of city action with regard to one-man car operation are on record. Perhaps the most striking is the case of Detroit. In this city in 1916 (before the advantages of one-man operation with the safety car were generally understood) the city passed an ordinance prohibiting the use of one-man cars in that city. As soon as the city of Detroit went into the street railway business, however, this ordinance was amended so as to permit of the use of one-man cars, and the city-owned lines placed an initial order for 200 standard one-man safety cars.

The overwhelming majority of electric railway companies, backed by every state legislature or commission that has acted on the matter, agree that the one-man safety car means better and more economical service to the public and a more interesting and higher paid job for the operator.

The report was submitted by R. P. Stevens, chairman; James P. Barnes, H. B. Flowers, W. H. Heulings, Jr., C. W. Kellogg and J. W. Passailaigue.

DISCUSSION ON SAFETY CARS

J. P. Barnes, Louisville, Ky., contributed to the discussion of one-man car operation by stating that at this stage of development of the electric railway industry the principle of safety car operation needs no defense and no propagandists. The safety car has made its way against all obstacles by sheer force of its intrinsic merits, and its further application to traffic problems becomes a matter of executive policy rather than of engineering data or operating rules.

Public opinion, like individual opinion, forms favorable conclusions from consideration of those things which are of direct advantage to the public, and is negative in that it is more quickly and deeply stirred by inconvenience than by convenience, by discomfort than by comfort and by self-interest than by altruism. All the signs and notices and all the newspaper advertisements that can be printed will not carry a conviction of comfort and convenience to the man whose feet are trod upon or whose fingers are pinched. With the introduction of safety car operation the advantages should be explained concisely and pointedly from the viewpoint of public comfort and convenience and the operation must be carried out so as to be a real fulfillment of the prediction of better things. The report of the committee says, "Cars of older types rebuilt for one-man operation but lacking adequate safety devices cannot properly be described as safety cars." This is not to say that every car should be equipped with all safety devices available, but that every car operated as a safety car and described as such to the public must be equipped with safety devices adequate to its territory. The final injunction of Mr. Barnes was:

"Operate real safety cars where safety cars are applicable; give adequate service, comfortable and convenient; let your service be, in short, of the quality you yourself expect from the lighting company, the water company and the telephone company. So, and not otherwise, will the safety car be a success with the public, a joy to the operator and a boon to the industry."

In discussing this report H. A. Mullet of the Milwaukee Electric Railway & Light Company said in part:

"Realizing the necessity of economies which are made possible through the operation of one-man cars and to avoid the opposition which frequently results in cities accustomed by long usage to double truck cars, it was thought expedient to secure for Milwaukee a one-man car conforming in general respects to the regulation safety car but of double truck type. A spacious platform, but without change in height above the rail as compared with the standard safety car or without a step between the body and platform floor, is provided. Separate entrance and exit doors selectively controlled and provided with a division rail to separate the flow of passengers are included.

"The aisle of the car is 28 in. The seats in the new Milwaukee car are 3 in. wider than in the standard safety car. Two seats only at the diagonal corners are longitudinal, the balance or twenty in number being of the cross-type. The longitudinal seats are effective in affording somewhat more passage space and are provided to avoid the congestion which exists in the front end of safety cars when operating under heavy traffic.

"It has long been the practice in Milwaukee to employ street fare collectors at heavy transfer points, and to allow this practice to be continued and applied to the new safety cars a device has been designed which makes it readily possible for the fare collector on the street through the use of a small lever carried with him to open the doors on the rear end of the car, thereby allowing passengers to board at the rear end while the car operator is receiving passengers at the forward end. The device has been worked out in a simple manner and is operating satisfactorily.

"The car complete weighs slightly less than twice the weight of a safety car and seats fifty-eight passengers, taking into account certain folding seats provided on the platform. It will be noted, therefore, that the weight of the car per seated passenger is approximately the same for the two types of cars.

"Transfers of the directional type are employed in Milwaukee. Four different colors representing the different directions are carried in a suitable holder which allows the operator to select the desired one without loss of time.

"To date, operation with one man per car has been commenced on but two lines, both being cross-town lines. One of these by reason of a stretch of single track is limited to a minimum of 7½ minutes headway. The other line is more representative and is being successfully operated at a schedule speed of 10.15 m.p.h., as compared with 10.38 before the crews were reduced from two to one man.

"During the month of August, the total passengers carried per car mile on the line which is double tracked for its entire length was 9.6, as compared with 9.63, the general average in the City of Milwaukee for the particular month. Checks made to determine the time of loading per passenger indicate that from 1¾ to 2¾ seconds are required per boarding passenger within a range of from twenty-five to five passengers, which is somewhat but not appreciably greater than the time required on the standard two-man car as heretofore operated in Milwaukee.

"The safety car as designed allows of its operation with either one or two man crews, and it has been possible therefore to operate these cars on certain portions of lines with two men crews while the balance of the routes running into the suburbs are handled by one man per car.

"The results of the operation of the double truck cars thus far accomplished are eminently satisfactory, and accordingly arrangements are being made for the extension of the one-man service to numerous cross town lines as well as others running through the more congested sections of the down town portion of the city."

H. H. Adams of the Chicago Surface lines described the sample single-truck safety car which had been built for his company and which was now in operation. The essential features of this car were described in the ELECTRIC RAILWAY JOURNAL for Jan. 22, 1921, page 173. Mr. Adams stated that his company was making further investigation in regard to the most suitable type of car for one man operation in Chicago, and with this in view they were now building in the company's shops a double truck car for one man operation. As at present arranged this car is 37 ft. 2 in. long, 8 ft. 6 in. wide, and will seat forty-five passengers. Separate entrance and exit openings with a longer platform will be provided with this double truck car the same as has been used for the single truck sample car.

W. J. Harvie, Auburn and Syracuse Electric Railway, commented on the definition of the term "safety car" as included in the committee's report and suggested that the word "special" be added so that the sentence would read "cars operated by one man and equipped with adequate special safety devices."

Martin Schreiber of the Public Service Railway of New Jersey said that the service which they had been obtaining from the standard type of safety car was generally satisfactory and that they had experienced no increase in the number of accidents from this operation.

E. M. Walker, Terre Haute, Indianapolis & Eastern Traction Company, referred to the 100 per cent operation of safety cars on his system and stated that the industry now had reached such a stage that safety car operation need not be defended as its use has proved conclusively that this type of car is an efficient salesman of transportation.

L. H. Palmer, United Railways & Electric Company, Baltimore, described the new type of safety car with separate entrance and exit, ten of which are in service on this company's line. These cars were described in the ELECTRIC RAILWAY JOURNAL for Sept. 10, 1921, page 400. In concluding Mr. Palmer said that the greatest need for railways at present was to give the public the best service possible and that the officials of the electric railway in Baltimore felt that the so-called standard safety car fell somewhat short in providing a service entirely satisfactory to patrons. He voiced the sentiment that railway officials should not allow themselves to get into a single-track frame of mind in regard to safety car operation and that the changes which they had found necessary to make in the last order for safety cars in the way of separate entrance and exits would tend to make this type of car even more popular with the traveling public and thus provide a substantial impetus to the use of one-man operated cars everywhere.

D. P. Abercrombie, Connecticut Valley Street Railway, in discussing the report stated that his experience with the use of one-man cars extended over a very short period. His observations as to the use of converted one-man double-truck cars have forced him to the conclusion that on long runs, involving many rates of fare, the number of duties placed upon the individual operator becomes too great and the operator is not able to collect properly all revenue from passengers. On shorter runs, however, with a flat fare it seemed to him that this type of car had a substantial possibility. It is regrettable that it has not been possible under the Massachusetts regulations to operate this type of car before, as it involves a substantial saving in platform labor.

It may be possible with the proper fare-collecting device for one operator on multi-zone lines to do more than is possible if the operators use the Rooke register. The present system of fare collection opens up substantial loopholes for the constant rider to ride substantial distances on a minimum fare, and furthermore, presents opportunities for the passenger to ride longer distances than he pays for even through the use of identification checks. These observations were formed from only a limited experience with this type of car and are subject therefore to criticism by those who have had longer experience.

At the latter end of the session when the president called for "unfinished business," there was a short renewal of the discussion on the safety car and it is included here so that it will all be together.

W. H. Sawyer, East St. Louis, criticised the expression "so-called" standard safety car. He thought the industry had taken a big step forward in the design of the usual type of single entrance-and-exit car. H. H. Adams, however, declared that neither the association nor any of its affiliated associations had adopted any car as standard. R. P. Stevens declared the committee had no intention of establishing standards in its report, but it was prepared only to supply information. He expressed the opinion that all one-man double truck cars should be equipped with safety devices.

Terminal Service Possibilities

J. R. Bibbins, manager department of transportation and communications U. S. Chamber of Commerce, then presented a paper on "Terminal Service Possibilities of the Electric Railways." This appears elsewhere in this issue.

In verbal explanation Mr. Bibbins explained that his paper might seem somewhat academic, but it was so prepared intentionally, partly because he wished to outline general principles and partly because many of those present were well able to make practical applications of the principles.

Address from Secretary Hoover

President Gadsden than announced that about two weeks ago he with other representatives of the association had seen Secretary Hoover of the Department of Commerce and he had agreed to present an address at the convention if official duties did not keep him in Washington. Mr. Hoover had found that it was impossible for him to be present but he had sent his address, which would be presented by F. M. Feiker, assistant to the Secretary.

Mr. Feiker on being introduced said that Mr. Hoover had expressed great interest in the problems of the electric railways. It is the philosophy in the Commerce Department for the Government not to do business in place of business men but for business men, and to utilize as far as possible the collective activities of men or groups of men in promoting industrial prosperity. He also explained that Mr. Hoover had personally taken a great deal of interest in preparing this address, which was written during one of his weekly single-day boat trips. He then read the address, which is published elsewhere in this issue.

Resolutions

The report of the resolutions committee was then presented by Mr. Bozell. The resolutions, which were unanimously adopted, follow:

Service by Mr. Gadsden

Whereas, Philip H. Gadsden, called in a time of peculiar need, has served the association as its president for the past year in a remarkable manner of usefulness and service to the industry and the association, and

Whereas, Mr. Gadsden has given unstintingly of his time and thoughts to the difficult problems of association organization and operation during the year, and

Whereas, Mr. Gadsden has in addition given a special and immeasurable service to the industry through his constant willingness and ability to present in public in many and various places in the country the peculiar problems of the industry, therefore,

Be it resolved, that the association hereby record its deep appreciation of the extraordinary service Mr. Gadsden has rendered and extend its sincere thanks and indicate its obligation to him.

Tribute to Officers

Whereas, the past year has been one which, for several special reasons, has demanded extra and extraordinary service on the part of the officers of the association, and

Whereas, they have given unsparingly of their time and thought in the effort to have the association perform its proper function and prove of greater usefulness to the industry, now therefore,

Be it resolved, that the association express its appreciation and thanks to the officers for this service.

Death of Mr. Landers

Whereas, the association has learned with deep regret of the death of J. J. Landers, auditor of the York Railways, president of the American Electric Railway Accountants' Association, and a member of the executive committee of the association, and

Whereas, Mr. Landers was a man of sterling character and high purpose and served this association and its affiliated association in a spirit of true service.

Be it hereby resolved, that, we do record our appreciation of his worth and service and our sorrow at his loss from our midst.

Death of Mr. Littell

Whereas, the association has heard of the death, last spring, of Hardin H. Littell, one of the organizers of this association and the first president of the association, and

Whereas, we recognize the debt the industry and the association owe Mr. Littell for his early constructive work, and

Whereas, Mr. Littell was known to be by all his friends a man of courage, ability and accomplishment, a man of character and a loyal friend, therefore,

Be it resolved, that we do record our appreciation of his service to the industry, of his worth and of our sorrow at his loss from our midst.

Death of Mr. Wright

Whereas, the association has heard with deep regret of the sudden death of Thomas A. Wright, vice-president and general manager of the Wilkes-Barre Railway Company, and

Whereas, Mr. Wright was a man of strong personality, quiet and courageous, a genial companion and a warm and loyal friend. now, therefore,

Be it resolved, that we record our appreciation of his worth and our sorrow at his loss from our midst.

To the Speakers

Whereas, during this convention of the association, we have had the pleasure and benefit of having addresses presented to it by men outside of its membership, and

Whereas, these addresses have been of very great value to the association in its deliberations, now, therefore,

Be it resolved, that the thanks of the association be extended to Dr. J. Duncan Spaeth and Messrs. H. M. Addinsell, F. E. Frothingham, J. K. Newman, J. R. Bibbins and R. H. Babson.

To Mr. Hoover and Mr. Feiker

Whereas, the Secretary of Commerce of the United States, Herbert Hoover, though overloaded with the pressing problems of his office, particularly the unemployment situation and the condition of dislocated industry of national importance, has nevertheless recognized the importance of the electric railway industry and its problems, and

Whereas, Mr. Hoover has prepared a message to the association and has sent his personal representative, F. M. Feiker, assistant to the Secretary, to present the message in person, therefore,

Be it resolved, that we express our appreciation to Mr. Hoover for his message and to Mr. Feiker for his personal presentation.

SUPPORT OF TECHNICAL PRESS

Whereas, the association recognizes the value in any field of a strong technical press and the close interdependence of interest of an industry with the technical and business papers which serve it, therefore,

Be it resolved, that the association express its appreciation of the excellent service to and support of the industry and association rendered by papers in the electric railway field.

President Gadsden then stated that the time had arrived to lay down the gavel and he appointed a committee to escort the new officers of the association to the platform. All were present with the exception of Mr. Emmons.

Mr. Todd expressed his appreciation of the honor accorded to him and pledged his best efforts in behalf of the association. Mr. Budd urged a more general adoption of the policies recommended by the association, and said he referred particularly to the organization of safety committees. Mr. Shanahan urged the co-operation of all during the coming year and Mr. Coates emphasized this need by two stories.

President Todd, after saying that the reports scheduled for Monday morning but not presented would be placed on record, declared the meeting adjourned. Abstracts of these reports follow:

COMMITTEE OF ONE HUNDRED

In accordance with action taken at the 1920 convention, the Committee of One Hundred, with slight changes in personnel, has continued to function for the purpose of disseminating general information regarding the industry. This publicity and educational work has been carried on through cooperation of the Committee of One Hundred and the American Electric Railway Association, being under the direct supervision of the committee on publicity with the general approval of this committee.

The committee planned a dinner in New York City on July 8, 1921, in commemoration of its second anniversary, but it was postponed due to the impossibility of securing the desired speakers at that time. It is expected that this dinner will be held some time during this fall or winter. What the committee has in mind for the future has to do more particularly with matters affecting credit. Your committee feels that however good the results may be from local effort, the results in improving the credit of electric railway companies will not be so good unless this national campaign is carried on. The report was submitted by Henry R. Hayes, secretary and treasurer.

REPORT OF COMMITTEE ON COMPANY SECTIONS AND INDIVIDUAL MEMBERSHIP

Martin Schreiber, chairman, presented the report of the committee on company sections as follows:

There was only one company section of the association formed this year This, however, does not represent the full activities of the company section movement. At present individual members of the association number only about 830; while the company section individual members are nearly three times that number. So the company section idea is largely responsible for the individual memberships of the association.

If it had not been for the company sections during the past few years the record of the individual members would be rather a disappointing one. Now, it is generally considered that the possibilities of the American Electric Railway Association or any other body made up of individuals largely depends on its personnel, and since the company section is the strongest influence for increasing the efficiency and number of individuals identified with our association, why don't our member companies take more interest in organizing company sections?

F. G. Buffe, general manager for the receiver of the Kansas City Railways, says: "There is a broad field to cover in association work and that is the development of company sections. There is an opportunity in bringing to the army of electric railway employees the advantages of this co-operative work. Our organizations will best progress with the education of our minor officials, and through company sections this can be accomplished. We should all strive to make every employee of every street railway system in the United States an interested participant, feeling that he is a part of this gigantic combination of capital and labor, united for the public service."

The company section referred to as instituted this year is Section 13 of the association. It comprises the employees of the southern division of the Public Service Railway, Camden, N. J. This section was created and in operation in about one week after it was decided to go ahead and more than 200 members are enrolled.

It has been operating for less than a year but has quite a unique record. The monthly meetings of this section are not only an open forum for the rank and file of the company, but also for the public as well. To get a true view of the car riders, instead of an interpretation, often initiated by the company's mutual admiration society, prominent representatives of the public are invited to address the company men at the section meetings. Already the president of the City Council, the secretary of the Chamber of Commerce, president of the Rotary Club and the City Attorney have appeared at these meetings. In this way, these people are given a chance to talk directly to the persons who are really responsible, at least as far as the car rider can see, for the operation of the railway. If experience is any criterion, the experiment has been very satisfactory to all concerned.

Your committee does not intend to go into detail about a particular company section when such splendid work is being done by other company sections, such as those of the Community Traction Company, Connecticut Company, Chicago Elevated Railways, Newport News & Hampton Railway and others. But the committee mentions the work at Camden because it seems to be rather a new departure.

When officials go back to the job, the committee recommends they give the company section idea honest and sincere consideration. We believe that each one of you who does this will start a company section at the earliest possible time. Moreover, you will accomplish for your own company what Mr. Buffe has pointed out as well as give an impetus to the association that will put it in the position which it rightfully deserves. The members of the committee stand ready to render any aid that they can in the organization work.

REPORT OF JOINT COMMITTEE OF NATIONAL UTILITY ASSOCIATIONS

The joint committee of National Utility Associations was organized as the result of the belief that matters of a national character bearing equally upon and having the same relation to all utilities could be more effectively handled and confliction of effort avoided by a central conmmittee representing equally and impartially the three national associations most directly concerned. Preliminary discussions of the matter resulted in an organization meeting in the headquarters of the National Electric Light Association on Dec. 22, 1920, at which Randal Morgan was elected as temporary chairman by the representatives of the American Electric Railway Association, National Electric Light Association and American Gas Association.

The permanent officers elected at this meeting are: Randal Morgan, chairman; S. Z. Mitchell, vice-chairman, and O. H. Fogg, secretary. The executive committee members are: S. Z. Mitchell, chairman; P. H. Gadsden, vice-chairman, and O. H. Fogg, secretary.

Among the several sub-committees appointed that on taxation has been the most active, W. V. Hill having been temporarily retained to represent it in Washington. This committee has had under frequent advisement the various phases of federal taxation as they relate to public utilities and its chairman and representatives have presented the views of the committee before various governmental committees and officials. Its sub-committee appointed to confer with representatives of the Association of Railway Executives has had several meetings with representatives of that association. A sub-committee on fuel, of which J. W. Lieb is chairman, has been actively carrying on the activities formerly conducted by the National Committee on Gas and Electric Service in so far as they relate to the supply of fuel for the use of public utility companies.

A third meeting of the joint committee was held in the office of Mr. Mitchell, president Electric Bond & Share Company, Sept. 21. The question of tax-exempt securities and the constitutional amendment was discussed and the possibility of providing a modification of the present law. The National Tax Association has passed a resolution against tax-exempt securities.

Mr. Hill has also prepared a report on federal tax revision, a copy of which is attached as part of this report. It follows:

FEDERAL TAX REVISION

The sub-committee on federal taxation of the joint committee of public utilities associations consists of the following members: Philip H. Gadsden, chairman; Charles A. Munroe, Henry G. Bradlee, Frank W. Frueauff, R. A. Carter and Oscar E. Fogg, secretary.

While a report on the work of the committee on taxation at this time is somewhat premature, the tax revision bill having only passed the House, and at present being considered by the Senate finance committee, it may be of interest to some to know what has been done, and what is proposed by the committee.

Mr. Gadsden appeared before the Senate finance committee on May 10 last, during the consideration of a sales tax bill, urging against the levying of a sales or turnover tax on car fares, gas, electric light bills or meters, explaining the reasons for his objections; in fact, opposing a sales or turnover tax on regulated industry. He stated, however, that he favored a sales or turnover tax with the above exceptions. The finance committee subsequently placed the proposed sales tax bill in the discard.

Mr. Gadsden injected in his statement before the committee strong opposition to the continued issuance of tax-exempt securities by municipal, state and federal governments, calling attention to the serious effect this practice was having on public utilities securities competing in the open market with them and the effect on business in general. He also stated that he favored the repealing of the higher brackets on surtaxes and the excess profits tax.

The tax committee, realizing the increasingly adverse effect that the continued practice of issuing tax-exempt securities, especially by states and lesser subdivisions, was having on public utilities securities, as well as other taxable securities, started an educational publicity campaign and through the co-operation of the three national public utility associations, bankers, farmers, associations and others interested, a strong public sentiment has been developed in favor of immediate legislation to correct the evil. Unfortunately, however, legal authorities, in and out of Congress, who have made a study of the question, have concluded that the only remedy is through the enactment of a constitutional amendment, which cannot become effective until ratified by the legislatures of three-fourths of the states. Bills have been introduced by influential members in both houses of Congress to correct this situation, and a majority of the congressmen favor this legislation.

Also the ways and means committee prepared, approved and submitted on the floor of the House an amendment to the revenue revision bill, which would create a temporary commission to be appointed by the President, consisting of members of both Houses and the public, to study the situation and report within a year its findings and recommendations on this question. The amendment, owing to lack of sufficient time, was caught in the jam just before final vote was taken on the bill and was not adopted. We have assurances, however, that the Senate finance committee will embody it in the bill in that committee.

The ways and means committee of the House held four days hearings on the general tax revision bill. Mr. Gadsden was scheduled to appear on behalf of the tax committee on July 28, but at the last moment an urgent business engagement prevented, and the writer was asked to appear in his stead, making a short statement and filing with the committee a brief prepared by Mr. Gadsden. General publicity was given Mr. Gadsden's statement through the association's service letters and magazines; also other technical journals and the press. The Philadelphia *Public Ledger* printed a strong editorial indorsing Mr. Gadsden's views.

Mr. Gadsden advocated in his statement that public utilities be placed in a special class for the purpose of taxation, setting forth the reasons therefor. He protested against any increase in the normal income tax on gas, electric railway and electric light and power companies. He urged that normal income tax on public utilities be retained as at present at 10 per cent, giving reasons why this distinction should be made. He protested against a tax on undistributed income upon public utilities, and urged legislation to stop issuance of tax-exempt securities, and the repeal of the higher surtaxes and excess profits taxes, showing in detail the adverse effect these taxes have on public utilities.

The writer in his statement before the ways and means committee touched upon the proposed increase in normal income tax and undistributed income and the effect of these taxes on public utilities, and also urged that the committee give consideration to extending the tax exemption of 42 cents on one-way fares to one dollar, if it did not contemplate repealing all of the transportation tax at this time, explaining the reasons for this change.

The tax committee, through Mr. Gadsden, endeavored to get a hearing before the Senate finance committee to again urge a separate classification for public utilities for the income tax levy and also the repeal of the capital stock tax on public utilities, but Senator Penrose, chairman, advised us that no further hearings would be held, but we could file supplementary information and it would receive the careful attention of his committee. The tax committee will continue to watch the situation carefully as it develops in the Senate finance committee and until final enactment of the bill, and will endeavor to carry out the program as outlined by Mr. Gadsden. The committee asks for the continued co-operation of all interested in this important work.

Entertainment Features at the Convention

NOTWITHSTANDING the heavy business program of the convention a very pleasing entertainment program was provided for the delegates. It began with a golf tournament, at which O. A. Broten, National Pneumatic Company, won the kickers' handicap and L. A. Wilson, Ohio Brass Company, won low gross. The low net for the supply men was won by R. Wilson of the Westinghouse Electric & Manufacturing Company and for the railway men by G. T. Seely of Youngstown. The tournament between the railway and the supply men was won by the latter by a score of 7 to 1, there being eight players on each side.

Rain proved to be such a formidable obstacle that the ladies' obstacle golf game scheduled for Monday afternoon on the links of the Marlborough-Blenheim Hotel was canceled. The weather the rest of the week, however, was ideal. On Monday evening, the annual reception was held in the Venetion Ballroom of the Ambassador Hotel. In addition to the dancing, which continued into the early hours of the morning, an aquatic exhibition was provided by a number of expert men and girl swimmers for the entertainment of those who cared more for this than dancing. Included in the aquatic exhibition was a water polo contest engaged in by members of the association. The game was not finished as the ball mysteriously disappeared. The reception was enlivened by novelty features and professional dancing.

On Tuesday the ladies enjoyed an afternoon tea in the Japanese Tea Room of the Ambassador and music by the Special Ambassador Orchestra. The association dinner, made more pleasant by the presence of the ladies, was an innovation in the convention program and was generally pronounced a great success. Dancing followed the banquet.

Wednesday afternoon the ladies indulged in a bridge tournament at the Ritz-Carlton Hotel and in the evening there was a grand ball in the Renaissance Room of the Ambassador. Another informal tea, in the Trellis Room of the Ritz-Carlton, with music by Veschey's Parisian Band, formed the afternoon entertainment for the ladies on Thursday. The convention concluded with a theater party that evening, at which the delegates were entertained by Ed Wynn in "A Perfect Fool."

A large committee, under the direction of Chairman Edwin C. Faber, was responsible for the elaborate and highly successful entertainment program provided.

Engineering Association Proceedings

Engineers Held Five Busy Sessions at Which Experts from Outside the Association Were Heard—Unusual Amount of Prepared Discussion Followed Presentation of Reports—C. S. Kimball Elected President—Retiring President Gove Suggested a Committee to Study Possible Improvements in Organization

W. G. GOVE
Retiring President

CHARLES S. KIMBALL
Newly Elected President

PRESIDENT W. G. GOVE opened the convention of the American Electric Railway Engineering Association on the afternoon of Oct. 3 in the Solarium of Haddon Hall. The first number on the program was the reading of the presidential address by Mr. Gove. An abstract of this follows:

MR. GOVE RECOMMENDS SOME REVISION OF ASSOCIATION PROCEDURE

This convention marks the end of the eighteenth year of the existence of this association, under one name or another, as an independent association or one affiliated with the American Electric Railway Association. It is incredible that changes cannot be made in its constitution and procedure that would greatly enhance the standing of the association and the value of its work. As in every other industry, the experience of the past is of value in shaping the course for the future, but it is not a safe or proper guide as to just what should be done. New methods must be found; modern ways of obtaining more efficient and prompter results should be devised.

The American Electric Railway Association has found it desirable to appoint a reorganization committee, with a view to modernizing and increasing the efficiency of its organization. Similarly this association should take up the work of reorganization. The time is now ripe for the appointment of a reorganization committee by the incoming president, to report the results of its work to the executive committee as early in 1922 as possible. I wish, therefore, to make an earnest presentation of facts as I see them with the recommendation that the association inaugurate promptly certain reforms and changes. These could not but be beneficial and would be consistent with the action recently taken by associations similar to this.

Following are some of the things that, I think, the association should do.

1. Definite recommendations have been made by the reorganization committee of the American Association, which include several features that are deserving of very careful consideration by those charged with the responsibility of shaping the destinies of the American Electric Railway Engineering Association.

To the extent that the American Association exercises supervision of this association and its organization, including provision for financing its work, and continues the present policy of denying the Engineering Association an adequate appropriation for carrying along its research and committee work, the results which can be expected are limited. The policy of paying none of the expenses of standing (or working) committees, and depending entirely upon the generosity, enthusiasm or ability of member companies to pay the expenses of its employees when engaged on committee work is a restriction that cannot but militate against the value of the results finally obtained.

As a further item of direct interest to the association, it will be noted that the reorganization committee of the American Association has recommended the continuance of *Aera*. This has been a matter discussed for some years, and there is wide divergence of opinion as to its value. Inasmuch as it is likely to be continued, however, I appreciate that the magazine can be made use of by your association in reporting proceedings, or as a means of obtaining more widespread discussion of committee work. Publication of such reports should be made from time to time, and the final report of the committee should be printed previous to the convention. Under the present procedure I see no advantage that accrues to the Engineering Association. Furthermore, there is the Question Box, which occupies space and incurs expense that could be better devoted to the interests of the Engineering Association. This would aid the association in taking its proper place among the national engineering associations.

SIMPLIFICATION OF COMMITTEE WORK

2. The carrying along of work from year to year by means of standing committees has accomplished some results. If, however, the industry at large is to be greatly benefited by current rather than "post-mortem" action, there needs to be a radical change in the methods pursued in carrying on research work. All committees should, so far as possible, be equally divided in membership between engineering representatives of manufacturers and railroad operating engineers. Committees today are altogether too large, and have too many subjects assigned to them. Due to the financial policy already mentioned, about 85 per cent of the committee work done in accordance with the yearly assignment of subjects is performed by comparatively few men from a few Eastern cities. Many of those appointed take little interest in the work. Even if the very considerable financial obstacle to the proper accomplishment of committee work cannot be immediately removed, much can be done by organizing committees to represent more nearly the various sections of the United States. Discussion, even through the mail, should insure wider discussion of recommendations than at present, and the representation of the views of a larger section of the country. Subjects should be very carefully considered some months in advance of the convention and only a few of them assigned to each committee.

As a member of the American Society of Civil Engineers, I was greatly impressed by an address of Edward J. Mehren, editor of *Engineering News-Record*, delivered at that association's headquarters on Jan. 5, 1921. He summarized present industrial and political conditions in western Europe and Germany, the particular feature of interest to the Engineering Association being his reference to "standardization or direction of design." While standardization is of the greatest importance, it will never be fully effected. In fact, if carried too far it will retard rather than develop an art. While the work of the standing committees has done much in this field, an equal amount, or more, could be accomplished if certain consideration in the matter of design were given in advance. For instance, in connection with rolling stock we have all agreed that a universal application of a standard car is out of the question, but it should be entirely possible, and would be of considerable economic value, to have standard types of cars. Today the safety, or one-man, car most nearly approaches this condition, although there is already a disposition seriously to criticise this type. Premiums or penalties in the form of an increased first cost are paid to obtain something special to meet either assumed or real "local conditions."

To offset this, closer co-operation in advance of production by the manufacturer and with the railway engineer might be carried along with the aid of an advisory committee. This should be restricted in number, but should, like other committees, include an equal number of manufacturing and operating engineers. Among the latter should be a civil, a mechanical, and an electrical engineer. The committee should function separately from the standards committee and should have a secretary-engineer as its nominal head. There need be no restriction as to the number of types of cars. The list could include buses, for instance.

The standardization by types is an economic necessity at a time when the industry is struggling to find means of producing increased efficiency and economy and when it is highly probable that trackless trolleys and buses will be added to the equipment of public service utilities. Why should not careful consideration be given to standardization in the development of such vehicles rather than leave them for "post-mortem" consideration?

WHO SHOULD VOTE ON THE EQUIPMENT STANDARDS?

3. Voting upon standards at present is done on a wrong basis, as can be seen by a simple illustration. Take the case of rolled steel wheels regarding which a company operating a few cars with cast-iron wheels has as much to say as one operating 50,000 rolled steel wheels. The cast-iron wheel user can criticise the steel wheels and share in determining the characteristics of the steel wheels. Voting upon standards should follow the long-established practice of the Master Mechanics' and Master Car Builders' Associations, now the mechanical division of the American Railway Association. There standards bearing upon rolling stock are voted for upon a unit basis, the company voting the number of cars owned. In power generation, line distribution and affiliated matters, kilowatt output for railway purposes, should govern. So also should the number of single-track miles operated in all way and structure matters. For manufacturer members a unit based upon gross sales could be worked out. Perhaps in both cases only those directly concerned with the subject at issue should vote.

4. A permanent organization should be provided by having a paid head of marked ability. It is all right to elect a president each year, if desired, as at present, but there should be a secretary-engineer, who would be the nominal head of the Engineering Association in all matters excepting those having to do with direct administration and policy. These, of course, rest now and should continue to rest with the executive committee. Thus continuity of action from time to time could be assured. The technical correspondence and the co-ordination of all committee work could be carried along from year to year, regardless of changes in the office of president, or changes within the executive committee. Such a plan would only be consistent with the practice of such national associations as the American Society of Civil Engineers, the American Society of Mechanical Engineers, the American Institute of Electrical Engineers and others of national importance.

AS TO THE IMPROVEMENTS IN THE ENGINEERING MANUAL

5. The *Engineering Manual* is the record of committee determinations and findings. It should bear to the association and the industry at large much the same relation as does "Kent's Handbook" to the mechanical engineer and "Trautwine" to the civil engineer. The *Engineering Manual* is valuable, but from time to time questions have arisen as to its being in proper form; also as to the method of binding, providing for additional copies in whole or in part, and other pertinent questions. I recommend that this matter be made a part of the work of the proposed reorganization committee so that it may be determined in a manner consistent with up-to-date methods and practices.

CO-OPERATION WITH AMERICAN ENGINEERING STANDARDS COMMITTEE

The association has taken a progressive step in obtaining representation in the American Engineering Standards Committee. This organization is comprised of representatives of leading engineering, railway and other associations, and has the object of unifying methods and promulgating rules for developing standards. The literal carrying out of such a purpose would undoubtedly be of very considerable value to the electric railway industry. But until the organizaton of the association provides for more active research work throughout the entire industry this purpose cannot be fully accomplished as far as the electric railway industry is concerned.

In submitting these suggestions I realize that they will not meet with universal approval. It is always easier to continue doing what has been done than to make somewhat radical changes in methods. However, there never was a period when changes could be made to greater advantage than now, and there are comparatively few matters that can properly be carried along in the same way as was the practice but a few years ago. My object in making these recommendations is only to suggest ways of giving the association a higher standing among the other national engineering associations to which foreign countries are looking for engineering progress. I trust that such changes can be made as will, in the end, render more valuable the results of the committee work as embodied in the Engineering Manual.

SECRETARY WELSH REPORTS

Secretary J. W. Welsh then presented the report of the executive committee. This, he said consisted of the minutes of the committee meetings for the year. It was accepted without reading, for publication in the proceedings.

Mr. Welsh also read his report as secretary. He gave statistics of the attendance at committee meetings, showing a very high average attendance. He also explained the ways in which the association is co-operating with the American Engineering Standards Committee. He gave as the present membership the following: individual members, 533; company section members, 451; total 984. The report of the secretary was accepted.

The next business was the appointment of a committee on resolutions as follows: H. H. Norris, H. H. George and R. H. Dalgleish.

REPORT ON APPRENTICE SYSTEMS PRESENTED

The report of the committee on apprentice systems was next read by F. R. Phillips, chairman. An abstract follows:

APPRENTICESHIP SYSTEMS

The scope of the duties assigned to the committee on apprenticeship systems proved to be so great that it was able to submit only a suggested outline this year to serve as the foundation for a plan of apprenticeship training which may later be adopted by the association.

After a report upon the apprentice work being done by various organizations, including the Paris-Orleans Railway of France, a plan was outlined which follows steam railroad models, modified to suit the peculiar requirements of the electric railway business. This plan, in the committee's opinion, offers the best means by which the industry may secure recruits for its personnel.

The plan comprehends two sections: (1) A trade apprenticeship course, and (2) an engineering apprenticeship course.

The trade apprenticeship course provides for four years of continuous service in one trade, with accompanying classroom instruction. The classroom instruction would consist of two periods per week throughout the entire four years of apprenticeship, each of two hours duration. A summary of the curriculum follows:

First year, mechanical drawing and blueprint reading, two-thirds of time; practical shop arithmetic, remaining time.

Second year, mechanical drawing and study of elementary mechanism, half time; remaining half of time to be devoted to study of tool designs, shop practice, etc.

Third year, study of general principles of electricity, electrical devices and machines, half time; other half to be devoted to further study of problems connected with the apprentice's particular trade.

Fourth year, details of electrical mechanical equipment used on cars of the company, half time; remaining time to be devoted to instruction in the rules and regulations of federal, state and municipal bodies relating to the company's cars, and some instruction in elementary economics as applied to the company's business and everyday life of the apprentice.

It was the committee's opinion that for the developing of engineering apprentices some form of the co-operative training such as was originally inaugurated by the University of Cincinnati, and introduced later by the University of Pittsburgh and seventy other educational institutions more or less, would be most economical and satisfactory.

This report was signed by F. R. Phillips, chairman; L. C. Datz and H. A. Johnson.

DISCUSSION ON APPRENTICE SYSTEMS

Following the presentation of the report, prepared contributions to the discussion were presented by H. W. Cope. Westinghouse Electric & Manufacturing Company; E. P. Roundy, New York State Railways, and E. P. Waller, General Electric Company.

Mr. Cope said that the steam railroads and the large manufacturers had found a course of training for their young men to be indispensable, and he believed it possible for the electric railways to use a modified form of the apprenticeship system adopted by the steam railroads. He believed it desirable to work out more than one plan, owing to the differences among properties, due to size and environment. Some properties are so located that apprentices could attend classes at colleges or universities, while apprentices on other properties might take correspondence courses.

Mr. Cope suggested the organization, at association headquarters, of the proper personnel to guide this activity while in a formative state. He also suggested that the period of four years required to complete an apprenticeship course is too long. A shorter period of intensive training proved its effectiveness during the war.

In addition to a study of economics Mr. Cope suggested that the course might include the study of public relations. It is also very important that the men be rightly chosen at the start in order that time and money be saved by not trying to train misfits. He listed six subjects for consideration by the committee, *i.e*, (1) a special one-year course for college graduates; (2) more mathematics for trades apprenticeship courses; (3) a reduction of the age limit; (4) systematic scheduling of students through the various departments; (5) the making of an agreement under which both parties will have to make good; (6) the placing of the apprenticeship wage rate at a fixed percentage of the standard journeyman rate.

Mr. Roundy said that the report covers the ground very well, and from one of the plans described a system can be devised which will apply to electric railways. As it is the province of the colleges to give the necessary technical training it is not advisable for the electric railways to provide this. However, a young man attending college might be given four months of work each summer with an electric railway. Mr. Roundy believed the idea to be erroneous that a knowledge of the financial condition of the industry keeps college men away.

In the training of mechanics and tradesmen, Mr. Roundy said that technical training should be carried just far enough so that the mechanic understands the reason for doing the work as he is taught to do it. If he shows qualifications for foremanship the technical training may be continued. Technical training of foremen should not overlap that of the apprenticeship engineer.

Mr. Waller said that the apprentices of his company are taught shop trades and not engineering. The training given technical graduates is not an apprenticeship course. Most shop courses cover four years, but high-school graduates are given special credit for their school work, and this may amount to a reduction of one year in the apprenticeship course. Class work averages four hours a week. Classes are held in shop time and apprentices are paid their regular rate during class periods. Those who drop behind in their studies go into the school room on full time without pay until they catch up.

Mr. Waller said that in most cases the students spend from six months to a year in the training room and are then rotated through the shop departments. They remain on the payroll of the apprentice department, however, and regular reports are rendered by the shop. This prevents favoritism. Graduates from the course are given a diploma and a bonus of $100; and receive preference in shop promotions, other things being equal.

Mr. Waller believed it inadvisable to specify a definite ratio of shop apprentices to shop mechanics, as in some localities this might cause labor troubles. He also thought that the suggested course lacks mathematics, but in other respects it seems to be comprehensive. Mr. Waller referred to a booklet on shop apprenticeship system prepared by his company and which he recommended for reference by electric railway companies.

After the above discussion, L. C. Datz, American Cities Company, chairman of the committee on subjects. inaugurated a new procedure by reading the tentative assignment made by his committee immediately after the conclusion of discussion on the particular report.

HEAVY TRACTION REPORT PRESENTED

An abstract of the report of the committee on heavy traction was read by the chairman, Sidney Withington, New York, New Haven & Hartford Railroad. An abstract of this is given below.

HEAVY ELECTRIC TRACTION

A new feature of the report of the committee on heavy electric traction this year was a summary of the activities of other associations in the study of heavy traction matters. In this way the committee endeavored to coordinate the work of the American Railway Engineering Association, the International Railway Congress, the American Railway Association Mechanical Section, the American Institute of Electrical Engineers and the Association of Railway Electrical Engineers, in so far as this can be done by bringing the attention of the readers of the report to the work of these associations.

The outstanding features of the report this year were the compilation of data on electric locomotives and multiple-unit equipment and the bibliography of heavy traction literature. Complete data were included for electric locomotives of North and South America weighing more than 80 tons. Promise of similar data for European electrification was made for the future. A table is included giving the facts regarding multiple-unit trains practice for twenty railway companies in North America.

The electric locomotive data table contains forty items for each locomotive, including weights, dimensions, fundamental operating data and facts as to dates, manufacturers, etc. Accompanying the table was a chart of steam track mileage electrified and corresponding electric locomotive tonnage, showing that between 1905 and 1920 electrification was proceeding at the rate of 180 miles of track and 36,000 tons of locomotives per annum. There was a reasonably uniform relation between these two quantities, the average, of course, being 200 locomotive-tons per mile of track. No increase in trackage or tonnage was noted for 1920.

The table of data for multiple-unit trains of North America in heavy service contained twenty-four items and covered both electrified steam railroads and rapid transit lines in large cities. As to multiple-unit operation, the committee reported that in suburban electrification of railroads the application of multiple-unit equipment results in certain advantages as compared to electric locomotives, which may be summarized as follows:

The long heavy multiple-unit train accelerates more quickly than the train of the same weight hauled by a locomotive.

In a multiple-unit train the motor equipment is varied to correspond to the length of the train, and thus is often more efficiently used than in the electric locomotive.

The reliability of operation of multiple-unit equipment is somewhat greater than that of electric locomotive equipment.

The multiple-unit cars, being heated electrically in winter, are free from all difficulty connected with oil-burning steam boilers, and although the cost of power thus used in heating may be considerable, this convenience of operation is valuable.

Perhaps the most important advantage of multiple-unit equipment is in switching, especially in crowded stub-end terminals. Locomotive-drawn trains, after arrival at the terminal, must be backed out to free the locomotive. This extra double move is often necessary when the terminal tracks are most congested. The multiple-unit train, on the other hand, is ready for the return trip practically as soon as it has reached the terminal.

There are some limitations, however, to multiple-unit operation as compared with electric locomotives. Multiple-unit cars in general can be operated economically only over tracks equipped with energized third rail or trolley (although occasionally this type of equipment is hauled outside the electric zone by steam locomotives for short distances). The result is that the cars are not available for duty outside the electrified territory in the event of a local heavy traffic demand elsewhere.

The mileage of multiple-unit motor equipment is often less than that of an equivalent electric locomotive, on account of traffic limitations.

The maintenance, reduced to a seat-mile basis, is usually higher with multiple-unit equipment than in the case of electric locomotives and standard trailer coaches.

The decision between multiple-unit and locomotive equipment in each individual case is governed by local considerations. The excess cost of multiple-unit car maintenance is often offset by the saving made possible in terminal tracks on account of elimination of switching requirements. In general, it may be said that each type of equipment has its definite place in the heavy traction field.

In the design of multiple-unit equipment there is some question as to the relative advantages of trains made up of old motor cars as compared with motor cars and trailers. This question involves careful study of equipment, as well as terminal characteristics. One railroad which started electric operation with mixed motor car and trailer trains has since equipped all cars with motors, while another railroad, which started operation with all motor cars, has revised the initial policy by acquiring trailers.

The report concludes with a 104-page bibliography on heavy electric traction which was compiled with the co-operation of the association of railway electrical engineers. This covers all topics related to the rolling stock, track, power distribution, operation, economics, etc.

This report was signed by Sidney Withington, chairman; A. H. Armstrong, R. Beeuwkes, H. W. Cope, J. H. Davis, J. C. Davidson, J. V. B. Deur, C. H. Quereau and L. S. Wells.

DISCUSSION OF REPORT ON HEAVY TRACTION

The discussion of the report on heavy traction was opened by H. H. Norris, ELECTRIC RAILWAY JOURNAL. He pointed out that, in giving this year a synopsis of the electrification activities of the committees of the several national societies concerned with heavy traction, the heavy traction committee had taken one step toward the formation of an American committee on electrification. The compilation showed that there is much duplication of effort among the committees, which could be avoided through the functioning of such a joint committee. The value of a central, co-operative and unbiased agency of this kind would be very great. He suggested that the executive committee be requested to consider this matter as soon as convenient.

Mr. Norris said, further, that as an example of the kind of thing that such a co-operative committee could do, nothing would serve better than the elaborate bibliography which the committee had been able to present this year in collaboration with the Association of Railway Electrical Engineers. A joint committee could maintain such a bibliography continuously. He suggested that the association might later provide a condensed and more highly selective list of the most important articles, adding a brief summary of the salient features of each, including articles published up to the date of the completion of the list. The present list might well be reprinted in pamphlet form for sale at a nominal price and the association could advertise it along with other reprints, so that its existence would not be forgotten.

The compilation of the locomotive and multiple-unit car data, in Mr. Norris's opinion, was one of the outstanding features of the committee's report and of the year's work. He expressed the hope that the admixture therein of data regarding heavy multiple-unit car practice on steam roads, interurban lines and rapid transit urban lines would prove to be a prophecy of the time when there will be a greater community of interest between the steam and electric roads in relation to suburban passenger traffic.

Mr. Norris referred to the question that has been raised as to the appropriateness of electrification activity on the part of the American Electric Railway Engineering Association, the contention being that the matter is properly one for the steam railroads to consider and push. It is true that no electrification project is possible unless the railroads are convinced of the savings that can thus be affected. On the other hand, electric traction, having demonstrated its success under steam road conditions, is looking for new fields to develop. It is to be expected, therefore, that initiative will be exerted by the electrical manufacturing and operating interests. The steam railroads will necessarily be somewhat conservative in regard to this matter, partly from financial considerations, partly because they have so much money and talent tied up with their steam equipment. The electrical interests have therefore on their hands a "selling proposition" of enormous magnitude.

The next speaker was S. B. Cooper, Westinghouse Electric & Manufacturing Company, who urged the importance of the suggestion that the work of the committees of the several national associations be co-ordinated in so far as it relates to heavy traction. He also approved the suggestion that the bibliography be reprinted.

W. B. Potter, General Electric Company, also expressed a belief in the importance of inter-society co-operation. He said that there is no doubt of the existence of duplication of effort. Electrification is coming, said Mr. Potter, although it has hardly begun as yet. Conservation of fuel has come to the fore during the past few years. This together with the increasing economy in the generation of electrical power by steam and the development and interconnection of water-power plants, is a factor favoring electrification. Abroad there is much preliminary activity in this direction, and in this country in addition to the projects mentioned by the previous speaker there are several others which are only awaiting the arrival of favorable conditions.

Mr. Potter pointed out that the success of electrification from the operating standpoint is unquestioned. Also the comparative operating expenses with steam and electricity are well determined. If financial conditions improve, if power facilities continue to be developed and if the super-power plan of power distribution is perfected, then progress in railway electrification may confidently be looked for.

J. H. Davis, electrical engineer Baltimore & Ohio Railroad, called attention to the fact that the chart given by the committee did not include the pioneer electrification, that of the Baltimore & Ohio in 1895. He also pointed out the fact that the classification of the 6-9 type Baltimore & Ohio locomotive should be 0—8—0 and not 0—4—4—0 as given in the table.

After the discussion, L. C. Datz, for the committee on subject, explained, as he did in the preceding case, the tentative assignments for next year, following in general the recommendations of the committee.

A "vote of thanks" was then passed, recognizing the efforts of the committees and of those who had participated in the discussion.

Tuesday Afternoon Session

At the second session of the Engineering Association convention held on Tuesday afternoon the report of the committee on power generation was presented by A. B. Stitzer, Republic Engineers, Inc., chairman of the committee. An abstract of this follows:

POWER GENERATION

The work of the power generation committee for the year took the following form:

1. A recommended form of power contract and the suggestion that this be included in the association's "Miscellaneous Methods and Practices." This was a revision of the report of last year's committee, upon which no action was taken.

2. A supplement to the 1920 report on steam production with particular reference to stoker operation.

3. A comprehensive paper on automatic substations, with tabulation of data, distinction being drawn with regard to "metropolitan," suburban and interurban service.

The revisions made in the previously suggested form of power contract were such as to embody the results of constructive criticism of that form, in the hope that one could be prepared which would be acceptable. To facilitate examination of the proposed contract form it was presented in the report with comments in parallel columns, so that the reasons for each item as worded would be understood.

The report on this subject began with definitions of the four essentials of a contract as follows:

1. "Agreement"—All parties to the contract must agree on the same thing. There must be no misunderstanding about the point at issue.

2. "Two or more competent parties"—The parties must be competent in the eyes of the law to enter into the contract.

3. "Valuable Consideration" — The arrangement must be such that each party will receive something having value (however small) in the eyes of the law, in return for what he gives. A promise to give a present freely, with nothing in return, cannot be enforced at law.

4. "To do or not to do something that is lawful"—An agreement requiring the commission of an illegal act is not an enforceable contract.

Following the form of contract and comments was a memorandum discussing the changes which had been made in the form submitted last year.

As to costs of steam production, the committee reported the impracticability of securing data to check and supplement last year's report on this subject. The principal new material this year consisted in a preliminary statement of the results of stoker experiments made by the Minneapolis Street Railway. The equipment for this purpose consisted of a six-retort stoker, 10 ft. 8 in. in width and 10 ft. in horizontally projected length, placed with flush fronts under a 556-hp. B. & W. boiler set 11 ft. above the floor, with a 900-sq.ft. superheater but no economizer.

The main features of the stoker and furnace setting were: (1) Facility for controlling distribution of coal over fuel bed. (2) Agitation of lower fuel bed. (3) All grate surface effective for combustion. (4) Elimination of arch and bridge-wall reflecting surface. (5) Side wall protected by extension side wall tuyeres. (6) Adequate combustion chamber. (7) Control of air supply above fuel bed. (8) Control of air through lower tuyeres and dump grates. (9) Power dumping mechanism. (10) Exposure of lower boiler tubes for absorbing radiant heat.

The design produces a fuel bed of practically uniform depth, relatively low temperature at the surface of the fuel bed, thorough mixture of gases insuring complete combustion, high heat absorption by radiation to boiler tubes, low maintenance of furnace walls and stoker parts and lower percentage of combustible in the refuse.

These results were secured with bituminous coal of between 8,800 and 9,700 B.t.u. content, 14 to 20 per cent moisture, 16 to 22 per cent ash and 45 to 48 per cent fixed carbon.

In this section the committee stated the conclusion that for high fuel-burning capacity the underfeed stoker has proved to be the most flexible type of fuel burning equipment now available. Insufficient information was available to make possible any report on burning powdered fuel. Except under special conditions and in certain localities there is little probability of the adoption of fuel oil for steam production, until the supply and comparable price become stabilized.

The section of the report dealing with the automatic substations covered twenty-seven pages. A few of the high spots in it were as follows:

The automatic control of the substations in large cities for actual high-capacity, heavy-duty work is now an accomplished fact. The two unit substations of the Cleveland Railway have been operating with complete success. From the operating records available, automatic operation appears to be more reliable than manual operation. Apparently the ideal scheme of installation is to use the smallest possible single-unit stations located at relatively short distances from each other in a very simple and small building. Larger stations are necessary where service requirements are exacting and where the traffic density reaches a point where a service interruption results in large monetary loss.

The area or zone to be supplied by a station, which also fixes the capacity, should be determined primarily by the feeder investment and annual charges, together with losses occurring in the feeder layout. In large cities such other considerations enter as land values, building costs and restrictions, maintenance and operation costs, alternating current feeders and reliability of service. Where the multiple-unit station proves the most efficient and economical to install, the relatively simple and yet comprehensive scheme of automatic sequence operation will give the greatest possible service insurance, as well as good power economy.

In order to prevent reflecting unusual loads back on the rotary the feeder control must have these characteristics: The feeder must be opened promptly on short circuit and the feed to the disturbed sections must be resumed immediately at reduced potential. The best way to reduce the potential appears to be by means of tie feeders connecting to other stations, with an auxiliary bus.

Experimental work is now being done to overcome the difficulties which still exist in applying automatic control in large city systems. In some cases a plan of remote control superimposed on the "automatic" would be satisfactory. A plan for this purpose is this: The dispatcher's office would be located at a central point, preferably the general offices, from which telephone conductors would be extended to each of the automatic substations. At the dispatcher's office each of the automatic substations would be represented by a small panel upon which would be mounted small manually operated contact devices, such as telephone jacks, together with visual and audible signals. Certain master relays, or controlling devices making up the automatic substation control, could be so equipped that by the manipulation of the jacks on the dispatcher's board these relays or devices could be opened, closed or held out or in, as the occasion might demand. The signal lamps would indicate the positions of the relays so controlled. The functioning of these devices by reason of the automatic control would also set up corresponding signals at the dispatcher's board. To enable the dispatcher to know the load conditions of the substations, arrangement would be made to indicate in the dispatcher's office the loading of each station upon a chart. The control wires might also be used for telephone communication.

This section of the report contained also much information regarding the details of the Cleveland substations, and the results of calculations as to relative costs of manually and automatically controlled substations.

Regarding the Cleveland Railway the statement was made that even if there were no financial saving from the use of automatic control the resulting reliability of service would warrant its installation. The company plans eventually to convert the whole system to this type of control.

This report was signed by A. B. Stitzer, chairman; L. D. Bale, H. P. Bell, Walter E. Bryan, N. A. Carle, F. C. Chambers, H. E. Davis, C. A. Greenidge, H. A. Kidder, Charles F. Lloyd, George W. Saathoff, E. H. Scofield, L. R. Shattuck, Walter C. Shade, and E. P. Waller.

Mr. Stitzer first outlined the plan of the report and called upon W. E. Bryan, United Railways of St. Louis, to give the details of the suggested power-contract form. Mr. Bryan did so, giving special attention to the changes which had been made from the form suggested last year. On motion of C. S. Kimball, representing the committee on standards, it was voted to include the suggested form in the Manual under the head of "Miscellaneous Methods and Practices."

Mr. Stitzer then called on E. H. Scofield, Minneapolis Street Railway, to explain the section of the report devoted to power generation. The latter elaborated the printed matter, reading a written memorandum. He said that the work done at Minneapolis was undertaken when it was found that the possibilities with the chain grate and natural draft were inadequate to meet the requirements, both in capacity and operating efficiency, incident to the extreme demands on a steam plant when acting as an auxiliary to an inflexible power supply, such as a water power furnishing power for an urban railway load.

In working out the design of the stoker the most desirable feature of the chain grate, *i.e.* the steady travel of a fuel bed of uniform depth with the least possible agitation, was adopted. In all other respects the design departs materially from chain-grate practice.

The fuel as introduced by the rams is spread laterally by deflector plates so as to cover the surface between retorts. The action of these plates also loosens up the fuel, which, when containing large percentages of moisture and dirt, becomes densely packed while coming through the rams.

Retorts with their secondary rams, under independent control and extending in their action practically to the dump grates, insure a continuous movement of the fuel bed, filling blowholes which may start and maintaining a uniform fuel bed.

The front dump grate, by its lifting action, may be used to break up clinkers as they pass to the rear dump and hold back the fuel bed when the rear dump is dropped. Both front and rear dump grates are power operated and supplied with air, under control, for combustion. The entire grate surface thus becomes active when required; the carbon is burned down to a low percentage of the refuse before dumping; dumping may be done frequently on heavy loads without interfering with output or efficiency, and refuse is disposed of before it builds up into large clinkers.

Side-wall tuyeres, extending approximately to the top of the fuel bed, so designed that there is no dead pocket for lodgment of partially burned coal or clinkers, protect the brick of the side walls from the direct heat of the fuel bed. Both side-wall tuyeres and front-wall air boxes admit a limited amount of air underneath, and near the surface of the fuel bed, tempering the gases and forming a cool blanket over the lower furnace walls.

The rear furnace wall is so built as to expose 90 per cent of the tube length, resulting in a boiler surface double the area of the grate surface exposed to direct radiation from the furnace heat, and a combustion chamber of 13 cu. ft. per square foot of grate surface. The bridge wall rises from the dump grate to a level with the surface of the rear of the fuel bed, then recedes to the rear furnace wall.

A battery of high-velocity steam jets, placed in the front wall about 18 in. above the fuel-bed surface and directed parallel to this surface, thoroughly mix the gases, insuring complete combustion before they enter the tubes, and diverts the gas flow toward the back wall of the furnace, providing for a sweep of the gases over the full length of exposure of the boiler tubes.

Special baffling is designed to give a cross section of passage approximately proportional to the temperature of the gases.

Experience with this equipment has demonstrated the possibility of operating throughout a range from 100 per cent to 350 per cent of rating. Low-grade fuel is burned up to a rate of one ton per retort per hour, and the refuse is disposed of with no excessive loss of carbon or loss of capacity or efficiency while dumping. The air supply is controlled to the most efficient proportion; the furnace temperatures are low enough to prevent excessive clinker formation; little if any slag is formed on furnace walls, and highest efficiency is secured at or near normal rating.

This furnishes a unit of great flexibility, peculiarly adapted to standby and intermittent demands and reducing the losses from banking to the lowest possible in stoker practice.

Following Mr. Scofield, H. D. Savage, Combustion Engineering Corporation, read a paper regarding the burning of powdered fuel. An abstract of his paper follows:

THE BURNING OF PULVERIZED COAL

The obvious economic advantages of burning coal in pulverized form, particularly as applied to the varying load conditions of street railway operation, would seem to warrant more consideration than the brevity of the committee's report would indicate has been given.

The operation of the Oneida Street plant of the Milwaukee Electric Railway & Light Company during four years has warranted the building of the Lakeside station in such a manner that it would be impossible to use any other fuel than coal in pulverized form. It is safe to assume that the financial interests did not authorize the second station without careful scrutiny of cost versus results.

The cost may be considered under two heads; capital expenditure and operating cost.

The important results in street railway operation are: (1) The ultimate obtainable continuous capacity and ability to meet peak-load conditions. (2) The ability to maintain efficiencies during high ratings and peak periods. (3) The substantial reduction of stand-by losses.

As to capital expenditure, the initial cost will not be greater than for a stoker plant built under similar conditions. Comparative figures of a general nature would be misleading, as every individual plant is a separate engineering problem and involves features that do not apply to another plant. Figures purporting to show the cost of pulverized-coal plants on a unit basis, or a standard cost of coal preparation, are of absolutely no value.

Theoretically and in actual practice the cost of firing pulverized fuel plants, including the complete cost of preparation, is no greater than that of burning coal on stokers. The power required for pulverization is no greater than that required for operating the forced-draft fans and moving the stokers when multiple-retort stokers or underfeed stokers are used.

To realize adequately on the expenditure necessary for boiler plants it is necessary to drive them at the highest possible ratings. Powdered coal would seem to present an ideal opportunity for much higher continuous ratings than have been possible in the past. While stoker-fired boilers can be run for several hours at extremely high ratings, it is possible to run equally high ratings with powdered coal and to maintain them continuously. The usual interference from clinkering and slag does not apply to powdered-coal applications.

It is possible while operating at high ratings to maintain an efficiency far in excess of the normal operating efficiency with stoker-fired boilers. In stoker firing it is necessary, of course, to keep boilers under a considerable fire between the period of the morning peak and the afternoon peak. With powdered-coal firing, when the load begins to drop off, certain boilers are entirely shut off stopping the coal feed immediately. These boilers will carry pressure for several hours.

Recently one of the 1,308-hp. boilers at Lakeside was operated at 160 per cent of rating for five hours. The fuel feed was then stopped and the damper was closed. The boiler "popped" sixteen times during the next three hours. During the following twelve hours the boiler pressure dropped at the rate of about 15 lb. per hour, after which the pressure had dropped to 110 lb. That is, after banking the boiler pressure stayed at between 270 and 275 lb. for three hours and in the next twelve hours dropped 160 lb. The boiler could be brought up to rating in about five minutes after the fuel feed was started after an ordinary bank of eight hours, during which period the pressure generally dropped to about 200 lb. Thus a very large item of saving occurred during the banked period.

In summing up the advantages to be derived from powdered coal burning, the following may be stated: (1) The capital investment will be no greater than for any usual type of plant. (2) The cost of firing, from coal car to ash car, will be slightly less than with stokers. (3) The maintenance of the furnace and boiler will be less than with stokers. (4) High ratings and high efficiencies will be obtained no matter what the character of the fuel received. (5) The problem of plant operation will be much less complicated. (6) The load can be followed more closely. (7) There will be a very considerable saving in fuel under any condition.

AUTOMATIC SUBSTATION DISCUSSED

On the committee's topic of the automatic substation prepared discussions were presented by W. E. Bryan, United Railways of St. Louis; C. F. Lloyd, Westinghouse Electric & Manufacturing Company, and G. H. Roosevelt, General Electric Company.

Mr. Bryan said that he was heartily in accord with the view of the committee that in general the single-unit automatic substation is preferable to the multiple-unit station. If full advantage is to be taken of the possibilities of multiple-unit operation the buildings must be small and of simple design, located perhaps on the rear portions of lots of which the fronts are used for other purposes. The cost of land for the multiple-unit station is less per unit than for the single-unit station unless advantage is taken of such possibilities. An ideal system of automatic substations, said Mr. Bryan, is a number of single-unit stations none of which is loaded above its rated capacity for the maximum half hour. Then in case one station is out of service there would be ample capacity in converter equipment in adjacent stations to carry the load. Another item to consider is the fact that single-unit stations are considerably less complicated as to control apparatus than multiple-unit stations.

An important element, said Mr. Bryan, is the method of handling the direct-current feeder circuits. One manufacturing company is advocating, instead of the limiting resistance in each feeder, the use of a device which differentiates between a grounded circuit and a legitimate overload. With this device a grounded circuit would be disconnected from the bus or connected to a tie feeder running to another station, while a legitimate overload would be carried at full voltage unless the overload were sufficient to cause the converter circuit resistances to come into play. The subject of automatic substations is comparatively new and we may expect to see some of our present ideas subjected to modification as the art develops.

Mr. Lloyd said that the list of automatic installations included in the report is a convincing testimonial for this type of apparatus. Automatic control has come to stay. Continuing, he said that the deevlopment had been very rapid and during the past year had been largely in simplifying the equipment, wiring, etc. The usual equipment, he said, protects against starting on low alternating-current voltage, starting on reverse or single-phase, loss of high-tension phase, loss of low-tension phase, loss of machine field current, restarting when undesirable, overheating of machine, direct-current overloads, hot bearings, alternating-current overloads, direct-current reverse-current, over speed, failure to start, failure of field, failure to reverse polarity.

While the manufacturers have been working diligently to simplify the equipment, said Mr. Lloyd, the operating engineers have been active in simplifying the substation building. In Cleveland it was found possible to make a saving of 25 per cent in building cost without impairing the reliability of the substation. Instead of the roomy hand-operated station with all equipment under the roof, we now have a semi-outdoor type that requires only a very small building to house the converter, the automatic switching panels and protective resistance.

Mr. Lloyd said that it early became evident that the standard resistance type of feeder would not meet the requirements of the metropolitan field and now a selective tripping scheme is available for use in connection with direct-current feeders, allowing the carrying of heavy overloads without tripping, but tripping immediately on short circuit. He described the operation of this selective action and went into some detail regarding the several methods for handling direct-current feeders and the advantages of each. The problem of load-limiting resistance in the converter circuit becomes quite involved on large systems, said Mr. Lloyd, and the ventilation problem is one worthy of very careful consideration.

E. P. Waller, General Electric Company, was represented by G. H. Roosevelt of the same company, who said that although the report states that the single-unit station is the best, the multiple-unit installations in Cleveland do not bear this out because of the low cost of buildings and land used in that city. If the cost of the stations used for multiple units is placed on a comparative basis with the estimated costs of stations for single units, Mr. Roosevelt believed that it will be shown that two single units are superior to the multiple-unit installation. In any case, he said, the report is proof of the reliability of the automatic station, regardless of the number of units or the number of feeders concentrated at a station. The factors to be considered are wages, cost of copper and losses. The cost of operation of the manual station is higher than that of either two single units or a multiple-unit automatic installation. Mr. Roosevelt referred to an article in the Sept. 17 issue of the ELECTRIC RAILWAY JOURNAL describing a miniature layout of the entire track and trolley system of Atlanta. The arrangement there provides for two substations at the center of Atlanta, feeding all radiating trolleys.

After the proper location of the station has been determined the important consideration is the type of building. Now that automatic control has proved to be reliable the next step is to reduce installation costs. Automatic control is best adapted for application to converters operated twenty-four hours a day, as the chief economy is the elimination of operators. Mr. Roosevelt referred to one case under consideration where it is proposed to connect a manually operated machine to the bus one hour in the morning and evening to operate in multiple with the automatic units during the peak load. He said that operators can be of great service to the manufacturers by assisting in the determination of the proper feeder control systems. Is it better to use up copper in burning off a "short" or to delay service and call out the trouble gang?

R. H. Rice, board of supervising engineers, Chicago Traction, said that he is very much in favor of automatic substations, as they represent a means of obtaining additional stations without greatly increased cost. At present they have the disadvantage of extreme complexity and the chief objection is the load-limiting resistance and the resistance on the feeders. Mr. Rice introduced Victor E. Thelin, Chicago Surface Lines, who described briefly a substation which he has installed which uses no resistance on either feeders or converter circuit. Mr. Thelin said that he believes the one-unit station to be cheaper in the long run. He has been using the automatic reclosing circuit breaker, which is so designed that the breaker opens instantaneously. An inverse time-limit relay takes care of continuous overload. The shunt rotary is coming into use in connection with automatic substations. Its natural characteristics assist in distributing the load. The development of the automatic substation, said Mr. Thelin, is just beginning. The surface has only been scratched.

Following Mr. Thelin's remarks the recommendations of the committee on subjects were presented and the report of the committee was accepted.

Following this a paper was read by George B. Muldaur, general agent Underwriters' Laboratories, New York, N. Y., on "The Work of the Underwriters' Laboratories." This paper is abstracted elsewhere. Mr. Muldaur then showed a motion picture film giving the audience a graphic idea of the work of the laboratories.

The joint report on stores accounting by the committee on stores accounting of the Accountants' Association and the committee on purchases and stores of the Engineering Association was read at the accountants' meeting on Tuesday. An abstract of their report follows:

STORES ACCOUNTING

Consideration was given to material accounting having to do with the control over the money tied up in the inventories of materials and supplies and the adoption of methods helpful in so regulating such stocks as to minimize such investments without sacrificing service in operation. A preliminary step was to send out a questionnaire to some fifty representative electric railways located in all sections of the United States covering their methods and practices. Replies were received and studied from some twenty-six railways. The committee collaborated in this matter with the committee on purchases and stores of the Engineering Association. The conclusions follow:

A standard material classification is a very great help in the control and regulation of the stock account. Such a classification should be broad enough so that all electric railways can adopt it as a standard. Of twenty-two companies studied only ten had classifications which could be considered at all adequate and of those not more than two or three have forms for reporting under which intelligent conclusions could be drawn as to whether the stock was well regulated. From the best classifications found in use and from that of steam railroad materials recommended by the Railway Storekeepers' Association, a classification was prepared and recommended for adoption as the standard material classification for electric railways. This classification is appended to the report.

Two standard monthly material report forms are also recommended. One is a summary of totals according to storehouses and the second is a detailed report by storehouses and by material classifications, with a combined report for the system as a whole.

Stock books are recommended in storehouses, either in lieu of the more customary form of stock card or stock ledger sheet or in addition thereto. Very few roads are using such a book. Three which do are the Philadelphia Rapid Transit Company, the Public Service Railway of New Jersey and the Pittsburgh Railways. Some of the main advantages of the stock book are as follows:

1. By compelling an actual inventory and a checking of outstanding orders each month it puts the storekeeper in the best position to keep his stock at the proper level and change it according to current demands.

2. It makes it necessary to keep the stock in a better physical condition than under any other method.

3. It enables the storekeeper to keep a close watch on inactive and obsolete stock, otherwise not regularly obtainable.

4. When the material is listed in books, a large number of items can be handled more readily and more easily than on individual cards.

5. It provides a system that can be depended upon as to quantities of material on hand and due on orders, whereas the accuracy of a postal card or ledger record depends upon too many stock clerks issuing materials and office clerks posting entries.

Recommendations were also made as to working stocks, i.e., material drawn out of the storeroom in excess of the daily need and carried as a sub-stock in the shops, at the headquarters of a line or track foreman or at outlying points. A different practice exists on different roads in accounting for such materials. On some roads the practice is to charge out the material to the account for which it was drawn when taken from the storeroom. It would not therefore be inventoried when the general stores were inventoried. This method is deprecated as not sound accounting, as it tends to waste and deterioration of material because the control over it is not good.

On other roads such materials are not charged out when they are drawn out of stock, but when the materials are drawn from sub-stock and replace material used. At inventory time such sub-stocks are inventoried and also set up in the general stores account. This practice is recommended. However, to keep the stock at a reasonable limit and to control it, the report recommends that the general storekeeper and the official of the department interested agree in detail as to the quantities, locations, etc., for the working stocks, and the requisitions on the storekeeper simply be for such quantities as will maintain such working stocks to the limits as agreed upon in advance. Furthermore, stock books should be carried for such materials. By means of these records the stocks can easily be adjusted to the consumption requirements.

The report is signed by R. A. Weston, chairman; E. L. Austin, E. J. Boos, W. L. Davis and Erwin Fullerton for the Accountants' Association and by W. H. Staub, chairman; John Fleming, W. N. Ford, F. E. Henderson, P. F. McCall and H. H. Pace for the Engineering Association.

The discussion on this joint report appears in connection with the proceedings of the Accountants' Association.

Wednesday Morning Session

The presentation of the report of the committee on power distribution, having been postponed from the scheduled time on Tuesday, was taken up at a special session Wednesday morning.

POWER DISTRIBUTION

The outstanding feature of the report of the committee on power distribution this year was a compilation of information on composition and limits of economical wear of trolley wire. The committee divided the subject into: Composition of trolley wire, limits of economical wear and causes contributing to wear. The result of a questionnaire on these topics was given, together with the gist of articles on the subject by S. L. Foster, chief electrician United Railroads of San Francisco.

The committee also recommended a number of items to be submitted to the American Engineering Standards Committee, as follows: As "American Standard," the specification for galvanizing or sherardizing on iron and steel; as "Recommended American Practice," the specification for 600-volt direct-current overhead trolley construction; as "American Standard Specification," the specification for wood poles; as "American Standard Specification," the specifications for tubular steel poles; as "Recommended American Practice," the specification for round and grooved high-conductivity trolley wires, the specification for overhead line material, the railroad specifications for electric light, power supply and trolley lines crossing steam and electric railways, various specifications referring to insulated wires and cables, and the hard-drawn aluminum wire table.

It is not the thought of the committee that all of the above will be acceptable in the present form, but the plan is to set in motion the machinery necessary to bring about, through the American Engineering Standards Committee, such changes as will ultimately render them acceptable to all interests concerned.

On the subject of catenary overhead construction, the committee gave the results of a questionnaire, but recommended the continuation of the study. Progress was also reported as to the standard stranding of cables, regarding which the American Electric Railway Association has accepted joint sponsorship from the American Engineering Standards Committee. As this was the first occasion of the association becoming a sponsor for an American Engineering Standard, the committee gave, in an appendix to the report, a detailed record of the procedure being followed.

As to lightning arresters, both on cars and on the line, the committee expressed a conviction, resulting from a questionnaire on the subject, that traction properties are not giving this essential detail the consideration it should have. Further, the recommendation was made that all operating officials have a survey made of arrester equipment, with a view to bringing it up to recommend practice. Many properties are having lightning damage, due to improper installation or to lack of sufficient arresters, others are not providing proper protection by choke coils, still others have used arrester wiring of too large resistance, etc. The committee included specifications for installing arresters to insure the best results.

The report included a number of appendixes containing valuable data, questionnaire forms, etc. It was signed by Charles Rufus Harte, chairman;

Azel Ames, C. C. Beck, J. H. Drew, R. W. Eaton, H. H. Febrey, C. A. Harrington, C. J. Hixson, C. H. Jones, F. McVittie, M. B. Rosevear, W. Schaake, A. Schlesinger and F. J. White.

M. B. Rosevear, on behalf of the chairman, Charles Rufus Harte, introduced the several sections of the report. He called upon R. W. Eaton, public service engineer, Providence, R. I., to comment upon the joint crossing specification.

Mr. Eaton agreed with the statement of the committee that the specification is "incomplete, is in need of clarification in many places and of revision in many others and is not up to date." The most important question is how to proceed in future so as to produce a specification that will be likely to secure general acceptance. It seems desirable that further work by a restricted committee should be abandoned and that future efforts should be made through the American Engineering Standards Committee or the United States Bureau of Standards or both. It is too bad that the existing specification is not generally known and used by members. Probably the same situation applies on the steam railroads. Certainly the specification is not being adopted rapidly by state and other regulatory bodies.

Mr. Eaton though that the sponsorship of the specification is too restricted and that there is no prospect of constructive action through further co-operation with the steam railroads only. Further, conferences should be held between the power distribution committee and the Bureau of Standards regarding the details of the appropriate parts of the National Electrical Safety Code, so that in case, as now appears to be the trend, the national code is approved by state commissions, the views of electric railway men may be before the Bureau of Standards in connection with any revision of the code.

Next, speaking for himself as an individual, Mr. Rosevear said that the latest revision of the specification, as adopted at the 1919 convention of the association, was participated in by three bodies only; namely, the American Railway Association, the American Railway Engineering Association and the American Electric Railway Association. At that convention the speaker had voiced his objections to favorable action by the Engineering Association, but the report was nevertheless adopted, and it was explained that the revision was so much better than the original that it was advisable for this association to adopt it. It was also stated that further revision was required, and the specification was immediately referred back to the power distribution committee for such action, which, as the present report shows, has been impossible of accomplishment.

The committee at its June meeting thought that further action should be by all interested parties, not by a selected few, and that such general action, leading to the preparation of specifications that would be universally acceptable, might best be secured through the medium of the American Engineering Standards Committee. It was not the idea of the committee to submit the present specification as a basis for a general one as the committee was convinced that it was unsatisfactory in many respects.

Since the completion of the report, further consideration by some members of the committee has raised the question as to whether the action of the 1919 convention really should not be rescinded and the overhead crossing specification rejected and removed from the manual. Admittedly such action would be very radical and might subject the association to severe criticism for its changing attitude. Nevertheless, such action would seem to be a natural corollary of the committee's report. It would also give the association representatives on any general joint committee, such as are formed under the auspices of the American Engineering Standards Committee, greater freedom of action than if the specification remained in force as a "Recommended Specification."

Next a communication was read from Thomas Sproul, Public Service Electric Company. He said that he could not agree with the recommendation of the committee that the preparation of specifications covering the type of construction to be employed by electric light, power supply and trolley lines crossing steam and electric railways is a proper study for a committee organized under the auspices of the American Engineering Standards Committee. The subject is already completely covered by the National Electrical Safety Code, which includes rules covering all types of overhead and underground constructions, crossings being only a small part. To give separate consideration to a crossing specification will tend to interfere with the adoption of the entire code as a standard by the American Engineering Standards Committee.

General standardization of a crossing specification is particularly desirable, but an acceptable standard can only be prepared by basing such a specification on the National Electrical Safety Code, which, as the result of the care exercised in its preparation, is being adopted in many states as a basis for the preparation of rules regulating such construction. Mr. Sproul therefore urged that the association suggest to the committee on power distribution a revision of the specification in accordance with the National Electrical Safety Code, rather than that the construction of crossings be given separate study by a special committee under the auspices of the American Engineering Standards Committee.

Dr. M. G. Lloyd of the United States Bureau of Standards was next called upon. He spoke of the way in which the state commissions had made use of the National Electrical Safety Code, both in its original form, that of 1916, and the present revised form. It has largely taken the place of sundry codes previously used. It had an almost immediate effect in unifying procedure. No argument is needed as to the need for uniform rules. The men of the Bureau of Standards were disappointed that, in 1919, the association adopted the specification without consulting them. He hoped that the action would be rescinded, but said that there could be no objection to the calling of a conference on the subject by the American Engineering Standards Committee.

Speaking from the standpoints of several interests in this matter, Martin Schrieber, Public Service Railway, Camden, N. J., opposed rescinding of the 1919 action, particularly as the specification is to be revised. Opinion is divided as to the status of the safety code, and, he thought, both the code and the specification should go to the American Engineering Standards Committee. After this the recommendation of the committee was adopted.

OVERHEAD CATENARY CONSTRUCTION

The next topic taken up was the construction of catenary "overhead." In this connection W. K. Archbold, Archbold-Brady Company, read a communication from R. L. Allen, chief engineer of the company, stating that a type of supporting structure should be chosen with a view to the lowest annual capital and maintenance cost. The allowance for maintenance of wood poles should be studied in view of the prospect of constantly rising costs for renewals. It is difficult to lay down general rules for selecting spans and types of supports, due to the differences in conditions on different properties. Where line voltage is so high that the cost of insulators per mile is important, it is advisable to use longer catenary spans, especially if a large part of the track is on tangents. Where much feeder capacity is required, the total strains and cost may be reduced by using the feeder as a messenger.

As to the assumption that a steel messenger will have a modulus of elasticity of 29,000,000, this is correct for a single wire, but on account of the spring action in a stranded cable the value should be taken at about 22,000,000 in this case.

It would not seem desirable to put in steady strains as close as 300 ft. on tangents, as each fixture tends to make a hard spot in the wire, and general practice appears to be to place the steady strains from 500 ft. to 1,500 ft. apart. Sometimes they are omitted altogether. Again, if the line structures are substantial, full anchor bridges would not appear to be necessary.

The primary purpose of catenary

construction is to obtain a trolley contact without hard spots. The cause of arcing on a contact line is the impact at points of support. This varies directly with the pressure of the collector and the square of the speed. The weight of the portion of the hanger which is integral with the contact wire tends to increase the hammering effect. The force of this blow varies inversely as the weight of the contact wire per linear unit and inversely as its tension.

LONGER SPANS MAY BE CHEAPER

In a communication read as coming from M. W. Manz, the Ohio Brass Company, the writer gave an estimate of the saving secured by increasing span length from 150 ft. to 300 ft. He said that from 10 per cent to 15 per cent may thus be saved. With the longer spans as used on the Chicago, Milwaukee & St. Paul Railroad, two No. 0000 contact wires are supported on a ½-in. messenger with about 300 lb. loading per pole bracket. With a 7/16-in. messenger and one No. 0000 wire, the total load would be about 240 lb. per bracket.

Mr. Manz gave as a formula for curve work the statement that, approximately, the length of the mid-ordinate in feet is equal to seven-eighths of the product of the degrees of curvature and the square of half the long chord or half the pole spacing in percentage of 100 ft. He also expressed preference for a contact wire height of 24 ft., if commercial freight haulage is to be considered.

Mr. Manz gave a set of logarithmic diagrams for calculating sags and tensions for a wide range of spans, with provision for variation in temperature.

H. M. Gould, Department of Street Railways, Detroit, Mich., sent in a statement that the Department of Street Railways has installed catenary construction at two steam railroad crossings, the first one having a clear span of 190 ft., and covering thirteen tracks, and the second having three shorter spans and covering eight tracks. In both cases the contact wire is No. 00 round phono-electric, with ⅝-in. stud bronze clinch ears and a ⅝-in. round copper-clad steel hanger, looped over the messenger. In the first instance the messenger wires are ⅝ in., seven-strand, copper-clad steel, supported by two cross spans of the same material. In the second case the messenger wires are 5/16-in., seven-strand, copper-clad steel, suported by two cross spans of the same material. The span lengths were automatically fixed. Copper or copper-clad steel was used to ward off the corrosive action of the locomotive gases. A flexible hanger was used to cut down the wear on the trolley wire, which was installed 22 ft. above the rails as required by law. A hanger spacing of 15 ft. was decided upon as this is the maximum which will allow the trolley wheel just to raise the trolley wire and hanger. A ⅝-in. hanger was used because it was only necessary to thread a standard rod and this could be used with a standard ⅝-in. boss clinch ear.

This citation was made to show that the reasons for any particular installation are just as important as the details, and the quickest way to bring about standardization is to eliminate those methods which have no good reason for existing.

DISCUSSION ON QUALITIES OF TROLLEY WIRE

Mr. Rosevear opened the discussion on trolley wire by stating that the wire of today is better than earlier wire, but that specifications are needed to prevent the effects of haste in manufacture due to competitive conditions. He deplored the fact that so few companies purchase wire by the association specification. He then called upon the secretary to read a communication from S. L. Foster, Market Street Railway, San Francisco, who said that while what he wished to contribute is not new, this seems to be a good time to bring it up again. Although the trolley wire used on the San Francisco property was bought by the association specifications and carefully inspected, it occasionally "broke off like macaroni when we put it in a splicer," to use a lineman's words. While this may have been an exaggeration, the experience described was unusual and disconcerting. Mr. Foster said that he had heard of a practice followed in Europe of specifying a certain number of up-and-down bends in the wire to be withstood without fracture. He thought that if the wire in question had been subjected to such a test the defects would have been discovered. He said that the use of hard-drawn wire had been largely abandoned in San Francisco. Figure 8 and grooved wire had not been used there for many years.

Mr. Foster expressed preference for No. 00 round wire with 15-in. clinch ears. The clamp ear does not protect the lower surface of the wire where the blow of the passing trolley wheel is delivered. With the clinch ear, inclosing the wire all around, the lower surface of the wire is protected. By the judicious use of clinch ears much longer life can be secured from the whole length of the trolley wire.

Mr. Foster did not claim that the clinch ear will give ideal results. The ear should be carefully designed to give the smoothest possible entrance and exit for the passing trolley wheel and should have more metal around the trolley wire measured both transversely and vertically at the center than elsewhere.

On this subject H. M. Gould wrote that the lack of reliable data is a serious matter and is inexcusable. If the railways would make systematic tests of trolley-wire wear valuable data could be readily obtained. He said that he is working with one of the manufacturers in the development of a spring hanger and a flexible strain plate for the purpose of reducing wear on the trolley wire at the ears and strain points respectively.

The next speaker was Horace A. Staples, American Copper Products Company, who expressed preference for numerous reductions in wire drawing. Specifications should be considered from the standpoints both of the user and the manufacturer. Sometimes it seems as if it was believed that "if it's harder to make it's better." He thought the torsion test all right if that is what the customer wants, but he did not see why the tensile strength should be limited. The A. S. T. M. and A. E. R. A. specifications should be harmonized.

J. L. R. Glover, Bridgeport Brass Company, spoke regarding high-strength wire, in connection with which, as with all other wire, the matter of care in handling should be considered. Breaks are important as well as wear. Nicking is particularly bad. Wire is sensitive to handling both in erection and in the storeroom.

H. G. Burd, National Conduit & Cable Company, backed up Mr. Glover as to breaks. He thought that the reasons for non-use of the standard specification are lack of interest and the possibility of higher price.

E. H. Scofield, speaking for the railway men, said that fatigue should not be overlooked. Recent experiments showed 60 per cent of the breaks in a given case were due to this. More data are needed here. In the "Twin Cities" a flexible hanger and general use of span construction have eliminated hard spots. Then, as to the method of collection, Mr. Scofield said that in cities little has as yet been done with sliding contact. His experiments show that a shoe 3 in. to 4 in. long requires only one-half the pressure of a wheel. Wheel wear is largely due to burning. No flashing occurs with the shoe at high speed, and there is no vibration on the roof of the car. A great source of trouble with wheels is due to the fact that they wear "out of round."

The specification for overhead line material was then taken up. Certain minor revisions were approved and the specification was referred to the standards committee with a view to submission to the American Engineering Standards Committee. Other recommendations of the committee to the same end were approved.

Before the morning session was adjourned a suggestion was received from James H. Drew, Drew Electric Company, to the effect that sentiment out in the industry seems to favor some change in the form of the Engineering Manual to make it more convenient for use. President Gove said that this matter would undoubtedly have early attention. A resolution, suggested Monday by H. H. Norris, ELECTRIC RAILWAY JOURNAL, regarding a move to bring about unity of action in regard to electrification of steam railroads was passed.

After hearing a report from the committee on subjects regarding power-distribution-committee assignments for next year, the meeting adjourned.

Wednesday Afternoon Session

At the Wednesday afternoon session of the Engineering Association R. C. Cram, chairman, presented the report of the committee on way matters, in abstract, and discussion was called for as each subject was presented. Martin Schreiber, chairman of the committee on standards, presented the recommendations of that committee.

WAY MATTERS (INCLUDING WOOD PRESERVATION)

In presenting the report of the committee on way matters the chairman read from an abstract of it which was printed in connection with the advance copies. This is a new feature of convention reports. Attention was called by the chairman to the size of the report and to the number of subjects which he believed to be too many for adequate consideraton by any single committee.

The standardization of frogs requires adoption of standard track center distances, and a set of eight distances was recommended. The work of standardizing branch-off frogs received much study and a proposed scheme with a large number of tables was presented as a progress report. Similarly a set of tables for car clearance easement curves were given and a study of these tables by the members of the association was suggested. A set of engineering data for standard crossovers and turnouts was presented for adoption.

A progress report on curved contours for wheel treads indicated the desire for further study in co-operation with the equipment committee.

The subject of curved treads for plain girder and girder guard rails was exhaustively treated and includes a number of drawings. The committee recommended that the treads of the guard rails and plain girder rails be left as at present. An important recommendation is given, calling for the inclination of tilting of plain girder rails.

The progress report on the investigation of arc-weld joints contains matter of interest to all track engineers who are studying this type of joint. A large number of illustrations are included, covering apparatus and types of joints in use. Seven conclusions are reached, indicating the need for much more study of the process, and the subject is suggested for continuation.

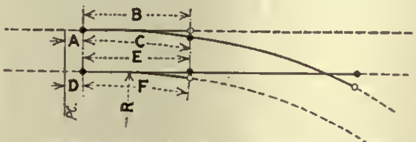
A complete specification for special trackwork of the rail-bound insert type was presented for adoption as a recommended specification.

The study of the proposed impression test for girder rails was continued in co-operation with representatives of the A.S.T.M. The test is proposed by the A.S.T.M. as a substitute for the drop test. Some modifications are suggested for the test as proposed by the A.S.T.M., but no agreement with the latter body was reached. The committee believes the subject needs further study.

A brief progress report on designs of substitute ties was presented, and the subject is suggested for continuation as it is considered to be of considerable importance. Time did not permit the committee to give the subject much attention.

The subject of wood preservation was considered jointly with the committee on buildings and structures and on power distribution. A separate joint report was found desirable, and this was presented separately. The joint report contains a mass of information on the whole subject of wood preservation as related to the electric railway industry. A number of recommended specifications covering different materials and processes was presented. The joint report includes a valuable glossary of terms used in wood preservation which is thought to be the first compendium of such information ever prepared. It should be of great service to all who have to study the general subject of wood preservation.

Several important changes in existing standards and recommendations



DIMENSIONS OF SWITCHES AND MATES

(This table is to be withdrawn in favor of the revised tahle herewith):

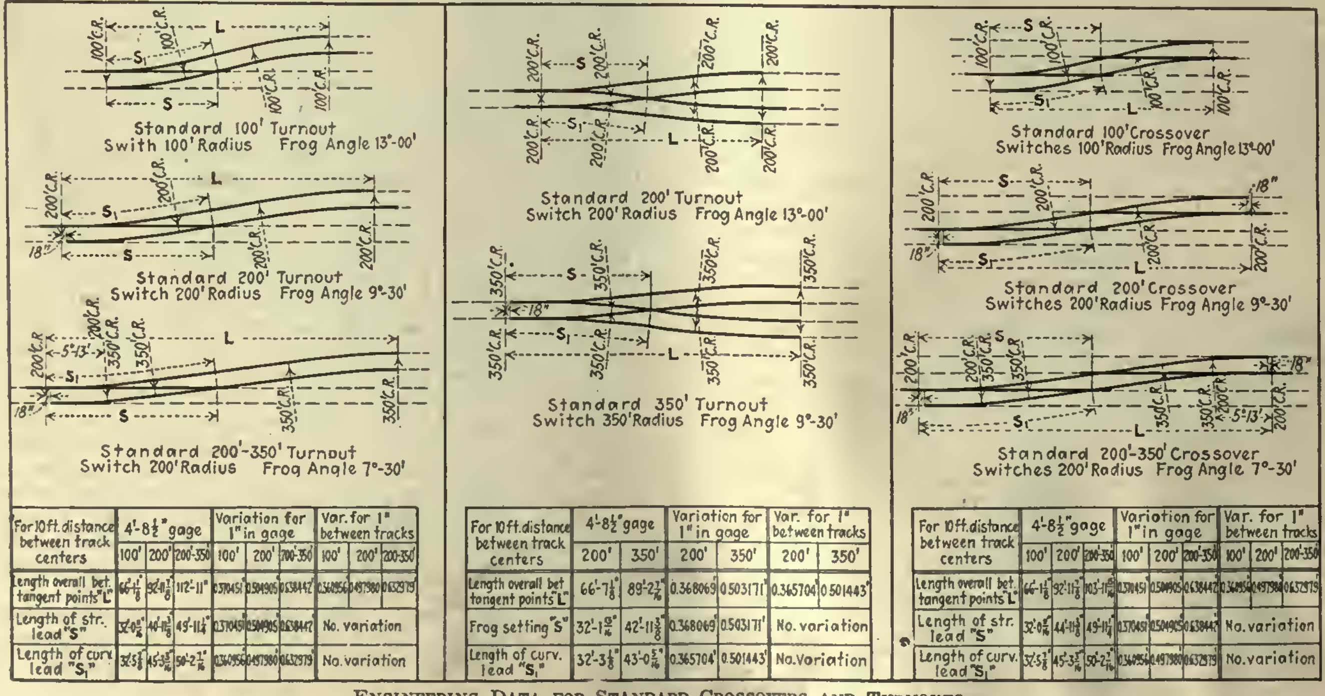
Standard Radius	Radius for All Gages R	Dimensions A	B and C	D	E an F
50-ft. lateral......	47 ft. 7½ in.	—6 in.	10 ft. 0 in.	—6 in.	10 ft. 0 in.
75-ft. lateral......	72 ft. 7½ in.	0 in.	12 ft. 0 in.	0 in.	12 ft. 0 in.
100-ft. lateral......	97 ft. 7½ in.	0 in.	13 ft. 6 in.	0 in.	13 ft. 6 in.
150-ft. lateral......	147 ft. 7½ in.	12 in.	15 ft. 0 in.	12 in.	15 ft. 0 in.
200-ft. lateral......	197 ft. 7½ in.	18 in.	16 ft. 6 in.	18 in.	16 ft. 6 in.
100-ft. wye.........	97 ft. 7½ in.	—6 in.	10 ft. 0 in.	—6 in.	10 ft. 0 in.
150-ft. wye.........	147 ft. 7½ in.	0 in.	12 ft. 0 in.	0 in.	12 ft. 0 In.
200-ft. wye.........	197 ft. 7½ in.	0 in.	13 ft. 6 in.	0 in.	13 ft. 6 in.
350-ft. wye.........	347 ft. 7½ in.	12 in.	16 ft. 6 in.	12 in.	16 ft. 6 in.

NOTE.—It is recommended that the 100-ft. radius lateral and 200-ft. radius wye shall be used wherever practicahle. It will rarely be found necessary to use others.

(This table submitted for adoption as standard design in lieu of the table opposite.)

Standard Radius	Radius for All Gages R	Dimensions A	B and C mate	D	E and F Tong. SW.
100-ft. lateral.....	**97 ft. 7½ In.**	**0 in.**	**13 ft. 6 in.**	**0 In.**	**13 ft. 6 in.**
200-ft. lateral.....	**197 ft. 7½ in.**	**18 in.**	**16 ft. 6 In.**	**18 In.**	**16 ft. 6 in.**
200-ft. equilateral	**197 ft. 7½ in.**	**0 in.**	**13 ft. 6 in.**	**0 in.**	**13 ft. 6 in.**
350-ft. equilateral	**347 ft. 7½ in.**	**12 in.**	**16 ft. 6 In.**	**12 in.**	**16 ft. 6 in.**
50-ft. lateral......	47 ft. 7½ in.	—6 in.	10 ft. 0 In.	—6 in.	10 ft. 0 in.
75-ft. lateral......	72 ft. 7½ in.	0 in.	12 ft. 0 in.	0 in.	12 ft. 0 in.
100-ft. equilateral. .	97 ft. 7½ in.	—6 in.	10 ft. 0 in.	—6 in.	10 ft. 0 in.

NOTE.—Radii and dimensions shown in light face type should only be used where special conditions will not permit the use of standard dimeusions shown in heavy face type.


100' C.R.
S
S₁
L
Standard 100' Turnout
Swith 100' Radius Frog Angle 13°-00'
200' C.R.
18"
Standard 200' Turnout
Switch 200' Radius Frog Angle 9°-30'
350' C.R.
5°-13'
Standard 200'-350' Turnout
Switch 200' Radius Frog Angle 7°-30'
Standard 200' Turnout
Switch 200' Radius Frog Angle 13°-00'
Standard 350' Turnout
Switch 350' Radius Frog Angle 9°-30'
Standard 100' Crossover
Switches 100' Radius Frog Angle 13°-00'
Standard 200' Crossover
Switches 200' Radius Frog Angle 9°-30'
Standard 200'-350' Crossover
Switches 200' Radius Frog Angle 7°-30'

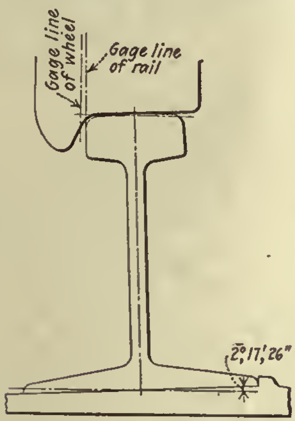
For 10 ft. distance between track centers	4'-8½" gage 100'	4'-8½" gage 200'	4'-8½" gage 200'-350'	Variation for 1" in gage 100'	Variation for 1" in gage 200'	Variation for 1" in gage 200'-350'	Var. for 1" between tracks 100'	Var. for 1" between tracks 200'	Var. for 1" between tracks 200'-350'
Length overall bet. tangent points "L"	66'-1⅛"	92'-11⅞"	112'-11"	0.370451"	0.504905"	0.638447"	0.360956"	0.497980"	0.632979"
Length of str. lead "S"	32'-0 11/16"	44'-11⅜"	49'-11¼"	0.370451"	0.504905"	0.638447"	No. variation		
Length of curv. lead "S₁"	32'-5⅜"	45'-3 5/16"	50'-2 7/16"	0.360956"	0.497980"	0.632979"	No. variation		

For 10 ft. distance between track centers	4'-8½" gage 200'	4'-8½" gage 350'	Variation for 1" in gage 200'	Variation for 1" in gage 350'	Var. for 1" between tracks 200'	Var. for 1" between tracks 350'
Length overall bet tangent points "L"	66'-7⅛"	89'-2 7/16"	0.368069"	0.503171"	0.365704"	0.501443"
Frog setting "S"	32'-1 13/16"	42'-11⅜"	0.368069"	0.503171"	No. variation	
Length of curv. lead "S₁"	32'-3⅛"	43'-0 5/16"	0.365704"	0.501443"	No. Variation	

For 10 ft. distance between track centers	4'-8½" gage 100'	4'-8½" gage 200'	4'-8½" gage 200'-350'	Variation for 1" in gage 100'	Variation for 1" in gage 200'	Variation for 1" in gage 200'-350'	Var. for 1" between tracks 100'	Var. for 1" between tracks 200'	Var. for 1" between tracks 200'-350'
Length overall bet. tangent points "L"	66'-1⅛"	92'-11⅞"	103'-11 [illegible]"	0.370451"	0.504905"	0.638447"	0.360956"	0.497980"	0.632979"
Length of str. lead "S"	32'-0 11/16"	44'-11⅜"	49'-11¼"	0.370451"	0.504905"	0.638447"	No. variation		
Length of curv. lead "S₁"	32'-5⅜"	45'-3 5/16"	50'-2 7/16"	0.360956"	0.497980"	0.632979"	No. variation		

ENGINEERING DATA FOR STANDARD CROSSOVERS AND TURNOUTS were proposed, the most important of these being the table of dimensions of switches and mates. This table is to be raised to the status of standard, and two switch radii are to be abandoned. These are the 150 ft. lateral and equilateral. Tables of the former recommendations and proposed standards are reproduced herewith.

A list of subjects which were suggested for study by the Engineering Experimental Station of Illinois University was reported, and ten standards and recommendations were presented for adopton as American Engineering Standards. The report also noted the fact that a special committee has been appointed to study the subject of all types of welded rail joints. The Engineering Association is represented on this committee by E. M. T. Ryder and H. M. Steward. The chairman is Dr. G. K. Burgess of the Bureau of Standards. The work is to be conducted under the auspices of the American Bureau of Welding, of which Prof. C. A. Adams is director.



METHOD OF INCLINING OR TILTING PLAIN GIRDER RAIL, USING INCLINED FACE TIE-PLATE

There were, all told, twenty-three recommendations submitted by the committee, seven of which called for action by the committee on standards.

PAPER ON SUBSTITUTE TIES READ

In connection with the discussion of the way committee's report, a paper on substitute ties was read by T. A. Ferneding, Dayton Mechanical Tie Company. An abstract of this follows:

Nature seems to have provided in the wood and in the soil from which it grows, the essential elements for the construction of good track. The increasing demand and the decreasing supply of wood suitable for cross ties, however, has forced the consideration of some kind of a substitute, but when we look around for that substitute, we are confronted with so many obstacles that we soon become confused. This, however, does not help, but it does suggest that we must confine ourselves to the fundamental principle of "resiliency" that is embodied in the wood tie.

The success of the reinforced concrete buildings gave rise to the thought that to use concrete as the foundation for the track in paved streets would overcome the high costs and failures of gravel and stone. So a concrete beam was laid under the rail as a substitute for a tie. This construction did not prove successful for two reasons: First, the two beams not being tied together gave way at different locations, thus throwing the track out of surface and gage. Then again, the heavy strains and blows that were delivered on the rail were readily and easily transmitted to the concrete, which soon began to deteriorate.

The next step was to increase the size of the concrete beams and construct a reinforced concrete slab on which to rest the rail. Theoretically this idea was fine and apparently had solved the problem of a substitute for wood ties. The idea was gathered from the reinforced concrete building, and made to apply to the track by shifting the steel in various positions. One very important factor, however, was overlooked and that was that the concrete was subjected to an entirely new condition. In the case of the building, the concrete merely had to support a heavy load under a continuous strain, without any abuse; but functioning as a track foundation, it not only has to perform the same duties as in the building but is subjected in addition to the abuse of having to withstand a heavy blow every time a wheel passes over the rail. Concrete, unmolested by any outside influences that will tend to destroy its integrity, will remain in a solid mass indefinitely, but subject to the impact of continuous blows, disintegration invariably follows.

Concrete, because of its strength and density, offers the best assistance to the use of a substitute tie. The steel reinforcement is not only preserved against corrosion but adds strength to the concrete itself and permits of a lesser amount of excavation, which also carries with it a saving of ballast. From a standpoint of economy and durability, reinforced concrete offers the best aid to the use of a substitute tie—with just one reservation—"if it can be properly protected." Through the efforts of the manufacturers in their endeavor to find a substitute tie, attention has been called to two kinds of track construction: monolithic and resilient.

Monolithic means steel in concrete in a solid mass. Resilient means any substance that contains the properties to yield, to give, to absorb, to deflect, etc. The meaning of the word monolithic has been, unfortunately, very frequently misunderstood. It has been said that a track laid on wood ties, with stone ballast and concrete in between the rails and on top of the ties was monolithic, but in reality it is resilient because of the shock-absorbing features of the wood in the gravel or stone ballast.

The mere finding of a substitute for the wood tie in itself is not sufficient, because there are so many other points that are so closely related to it that its use must be given very close consideration; i.e.: (1): the cost of the substitute must be considered, and its relative bearing on the total cost of track when completed. (2): the life of the substitute. By this is meant not only the life of the substitute itself, but the life of the track where the substitute is used. (3): the effect of the substitute. By this is meant the effect the substitute may have on the economy of operating other departments of the railway, as well as the effect on the track itself.

The years of experience that have been had in track construction where the basic principle has been that of "resiliency" and the reluctance with which many engineers are willing even to experiment with any kind of construction where this principle is not strictly adhered to is, I believe, sufficient proof of its correctness.

On the other hand, to deviate from this principle and cast it aside for something diametrically opposite, when the traffic conditions, weight of cars, etc., are growing worse, and assume that monolithic construction in track can go contrary to all the laws of nature and science, in my humble opinion, is not good judgment.

In conclusion, therefore, when selecting a substitute for the wood tie and its attending economies in first cost, select a foundation that is most durable and economical, but in the application of a substitute tie, do not lose sight of the positive destruction that follows when two non-resisting bodies come in communication with each other by an impact or a blow. The weaker of the two will necessarily deteriorate first, and in any construction where concrete is used in any form, no matter how strongly it is reinforced with steel, unless there is some substance interposed between the material receiving the blow and the concrete, the latter will start to disintegrate at the first impact, and its destruction compounded with each succeeding blow.

DISCUSSION ON OTHER FEATURES OF REPORT

In connection with the possible advantages of curved contours for treads of wheels, R. H. Dalgleish, Capital Traction Company, Washington, D. C., reported that he had turned a number of wheels to the contour as recommended by the way committee, and that these had made approximately 22,000 miles in service. There appeared to be slightly more wear on the flanges of wheels turned to this special contour than on standard wheels; otherwise they were apparently giving satisfactory service. Mr. Dalgleish referred to the difficulty of turning wheels to curved contours, but felt that the subject was of sufficient importance to warrant further investigation. He said that the excessive wear indicated by the first 10,000 miles of service was due to the cold rolling of the surface and not to actual wear.

Regarding welded joints, a letter was

read from W. W. Wysor, United Railways & Electric Company, Baltimore, in which he referred to his article in the issue of the Electric Railway Journal for July 30, 1921. He said that the simplicity, small equipment required, ease of application, cheapness, and freedom from interruption of traffic, all combine to make the arc-weld joint attractive. But there is something more to be done than simply buying an equipment and starting a man to welding. The work calls for careful supervision and skillful operators. Evidence is available to show that internal stresses are set up and chemical or metallurgical changes take place in the metal affected by the arc. In applying the arc-weld or seam-weld joint, by whatever process, we are not eliminating the joint. The rails should be abutted as closely as possible and should be milled or ground on the ends, and the bases slightly undercut so as to bring the heads together. After welding is completed the rail heads should be ground to a true surface and proper contour, using no more grinding than necessary.

Too much stress cannot be laid on the importance of selecting proper operators, men who will take an interest in the work. Such men will soon learn when they are making a proper weld.

E. C. Price, vice-president the Indianapolis Switch & Frog Company, Springfield, Ohio, discussed the report of the way committee at length. He said, in part:

That the subject of joints should lie dormant in the annals of the A. E. R. E. A. from 1910 until 1920 may be attributed to the constant activities on the part of the manufacturers in conducting research and in developing and exploiting special joints and bonds. The wisdom is self-evident of allowing sufficient time between periodical reviews to incorporate the "time and usage test," particularly of a product of this nature. Ten years ago very few street railways, and those confined mainly to the large centers, were using "welded joints," but today the property not employing some type of welded or semi-welded joint is the rare exception. The following statements refer to the "metal-electrode arc-welded joint" known as the "Indianapolis" joint.

The principle of this joint, which is a combined joint and bond, embodies four separate features in its construction and application, namely: (1) It is primarily a web-bearing joint; (2) it is essentially a metal-electrode joint; (3) it is eccentric in shape and contour, and (4) it is staggered.

The web contact feature is in keeping with the principle of the I-beam, of which the rail is a modified form. In splicing I-beam sections, web plates are riveted to both sides of the web, which in effect increases the thickness and reinforces the web. With the Indianapolis joint, the web of the rail is similarly reinforced with steel bars or plates, ¾ in. in thickness, integrally attached by welding and adding 1½ in. to the original thickness. Tests show the strength and resiliency at this joint to be greater than that of the unbroken rail, while tests for conductivity show 138 at the joint compared with 100 for the unbroken rail.

In the Indianapolis joint the best results follow the application of the plates with approximately 500-volt current, cut down through the "resistance welder." The metal electrode is still used not only as being dependable, but for the elimination of excessive or localized heat during the welding process, thereby preventing or reducing to a minimum certain detrimental after effects.

The plates are shaped sloping to afford a great welding area, thereby distributing the lines of force and dissipating the heat effects and also to avoid vertical lines of welding on the web, a matter of vital importance. The points of the plates are undercut, to prevent the joining of welding lines along the base with those coming down the web and to prevent excess welding or "dwelling" on the part of the welding operator at these points, thereby causing segregation. The plates are staggered further to obtain a distribution of lines of force and heat effects, by breaking the opposing lines of welding. The terminating of the joint at each end with but one plate extending and beveled has the effect of tapering off the section of the splicing members. This contibutes to elasticity and resiliency through the joint as a whole. When a severely rigid section, abruptly interposed within a line of flexibility, meets with sudden and concentrated lines of energy or stress, a condition is set up conducive to breakage or abnormal usage.

Experience with the joint has been had in more than 200 cities and towns over a period of nine years, and low maintenance costs have always followed the use of the joint where it has been properly installed under normal conditions.

The potential should be such that the "action" will "impregnate and weld" and avoid the two extremes of "burning" and "melting only" and the welding plates should be of selected mild carbon stock and of great tensile strength, toughness and flexibility.

The welding steel, the "fillet" material, should produce, in conjunction with minor portions of both the welding plates and the rail, a "melt" equal in characteristics to the plates. For example, the tensile strength of a "melt" of fluxated heat-treated electrodes tested from 56,000 to 70,000 lb., whereas a "melt" from the same basic steel without flux or treatment tested but 35,000 lb. per square inch.

The human element factor as it enters into the question of electric metal electrode welding covers a much greater scope than an operator's ability to "draw and hold a true arc." The operator who does not soon become an "artisan" in this respect is an exception, yet with lack of proper supervision or working under unwise directions of his superiors he will not do well. With the work properly done the results are satisfactory.

Paving should be of such nature as to protect and act as a binder to the rails. In new track, the rail ends should be squared or faced that they will abut tightly together, especially at the head. In case of old track, the opening should be closed with an insert, or filled in with welding. Joints should be gound to a smooth surface after welding. Care should be exercised in the selection of temperatures and seasons for installing welded joints, particularly in the case of new work.

Rolling stock should be in relation to track, both as to weight and condition. This not to be taken to mean that all of these constructive factors must be incorporated to admit of the use of arc-welded joints nor that the welded joints will not make up for many of the deficiencies existing in the average track. This they have done in many instances of record, but that is an extra or assumed function. Subnormal conditions include welding on rail that is precrystallized, rail that is eaten through with rust, rail that lacks any substructure or foundation and paving binder.

W. R. Dunham, Jr., then read a statement prepared by H. M. Gould and himself in which they stressed the importance of securing reliable service data in regard to welded joints. Among the attractive features of electric seam welding are that standard or non-standard joint plates can be used, the welding equipment can be easily transported and handled, the cost of welding equipment is not excessive and arc-weld bonds can be installed at the rail joints, at cross bonds or in the special work. At the same time seam-welded joints cannot act as substitutes for ties, ballast and pavement.

The speaker then showed a number of exhibits of joint work in Detroit. He also stated that the paper was intended as a means of clinching the argument that service records and a complete discussion of the policy to be followed will develop the best type of rail joint, whether it be the seam-welded or some other, with resultant benefits to the electric railway industry as a whole.

Chairman Cram then opened up for discussion the topic of girder rail specifications, which he said had been under discussion for two years. He thought that the subject might well be continued. He called on F. M. Speller and G. C. Farkell, both of the Lorain Steel Company, for discussion. The latter read a paper prepared by Mr. Speller and himself, of which the following is an abstract

Steel Mill Experts Discuss Drop and Impression Tests of Steel Rails

The use of the drop test for the purpose of determining the physical properties of rails as they are rolled can be said to be universal in this country. In nearly all specifications this test is the only physical test which is required.

There has long been doubt on the part of engineers as to the value of the drop test to determine the reliability of the rail, but no test has been devised which so nearly approximates some of the conditions under which steam-road rails are used. When the question of tests to determine the physical properties of rails, put into paving over which electrically propelled cars are operated, is considered, the value of the drop test becomes still more problematical. The lower speed of operation makes the blow from a flat wheel far less serious, while the use of the electric motor eliminates all blows such as are caused by reciprocating parts of the steam locomotive.

To indicate how extreme are the variations in a section of girder rails, the moment of inertia of girder sections now rolled was stated to vary from 31.2 to 182.1, while the metal in the head varies from 34.6 per cent to 66.3 per cent of the total weight.

Failures of drop tests on girder rails made according to the various specifications are extremely rare. There has been shipped to various customers by the rail mill at Lorain, since open-hearth steel was substituted for bessemer in 1909, 1,312,164 tons of girder rails, the product of 23,139 open-hearth heats. During this period there have been 310 failures of drop-test specimens on the original test. Duplicate tests allowed by the specifications withstood the tests in all except twelve cases, so that the total rejections for this period amounted to 710 tons of rail, or less than 0.05 per cent. More than half of these rejections occurred in a rolling of high-carbon and high-silicon steel for a customer who afterward modified his specifications to permit the use of a softer steel.

Objection to the drop test is made by manufacturers particularly when rolling the now prevailing heavy sections, on account of the considerable weight of good material required for the test pieces and the number of short rails which are made when "cutting these tests." In some cases, one-half the allowance of "shorts" is used to obtain the drop tests required.

Recognizing the limitations of the drop test, various engineers have turned their attention to other means for determining the physical properties of rails. Hardness tests have received considerable attention, one form of which, the impression test, has been included in certain specifications to supplement the information obtained from the drop test.

We have so far been unable to arrive at any satisfactory conclusions as to the causes of the occasional failures of individual rails before they get into the track. Chemical, tensile and impression tests made close to the point of breakage have in most cases failed to show any unusual conditions. Every rail rolled for a considerable period was tested by a heavy blow in the web, using a 16-lb. sledge, with negative results. We have been forced to the conclusion that such failures are due to extraordinary abuse when cold straightening the rail which causes failure at that time or introduces locked-up stresses which result in failure later, rather than to inherent brittleness of the steel. The cold straightening operation is a severe test, straining the material beyond the elastic limit at frequent intervals, both vertically and laterally. Should the steel have brittle characteristics, this fact should be developed during this operation.

It will be seen that the impression test furnishes useful information as to the uniformity of the steel with respect to its tensile strength and indirectly gives valuable information probably bearing a close relation to the wearing quality. If data as to the strength of the rails as measured by the impression were collected systematically, way engineers would in time have some valuable records of the steel in their track on which to base future specifications. Under the present American specifications the only records available are the analyses of the steel.

It is true that the impression test gives no information as to the brittleness of the steel, but are such data necessary in the case of girder rails, and if so, does the drop test give this information with sufficient precision to be worth while? Evidently not, by the records of drop test failures given above.

In conclusion the speaker suggested that the impression test proposed by the committee (and adopted by the A. S. T. M.) be included tentatively in the present specification, as an alternative for the drop test. If this is done arrangements will immediately be made for equipment to make this test concurrently with manufacture in the belief that the results will amply justify the expense involved.

Following Mr. Farkell's reading the report of the committee on way matters was accepted, and the report of the buildings and structures committee was next presented in abstract by D. E. Crouse, chairman. There was no discussion. An abstract of the report follows:

BUILDINGS AND STRUCTURES

The subject of equipment and postpayment of fares was investigated in co-operation with the Transportation and Traffic Association. The committee finds that postpayment schemes are but little used, while prepayment schemes are widely employed and are essentially the same as outlined in last year's report. Turnstiles promote a rapid flow of traffic, the device has but little to go wrong, requires but one attendant and assures a large percentage of fares.

The use of a change booth and coin box has possibilities for a more rapid flow of traffic, but there is the chance of loss of revenue through bad coins; also, in passing, patrons are inclined, in their speed, to throw coins hurriedly at the box, with the result that many coins bounce out, thus detracting the attention of the attendant. The use of a ticket booth and cancellation box is similar to this and has much the same characteristics. On the elevated lines of Chicago the attendant performs both functions by receiving and registering the fares as the patron passes the prepayment point.

The following suggestions are pertinent in the design of either a prepayment or postpayment area:

1. Traffic conditions should be anticipated through conference with plant officials or others in authority who are cognizant of them.
2. There should be an attempt to concentrate loading at as few points as possible, but with sufficient track room to permit loading in a minimum of time.
3. There should be sufficient reservoir capacity in entrance or exits to permit an even flow of traffic.
4. Arrange for operation at a minimum of expense by utilizing plant employees, etc., at rush hours.
5. Allow for storage of cars as the prepayment point is often at a train terminal.

Other means of speeding up loading are front end collection, fare receipts and queues. The advantage of front-end collection is that it permits loading twice as fast. The principal disadvantage is that there is no way of checking the number of passengers in the car against the fares registered. Where fare receipts are sold by traffic inspectors to waiting passengers at congested loading or transfer points the conductor simply collects the receipts instead of making change also. This scheme offers decided advantages to properties using one-man cars and those having a flat fare in excess of 5 cents. It does not in any way interfere with the operation of registering devices nor does it impair data taken therefrom. There is no dual responsibility as between conductors and collectors.

Queue loading can hardly be classed as a prepayment feature except as it facilitates loading. It is a logical outgrowth of the use of safety platforms.

SHOP LAYOUTS

Two typical layouts have been designed, one for a property having 150 cars and the other for one having 250. In addition, plans of several representative existing shops are also submitted. It was deemed advisable by both the equipment committee and the buildings and structures committee to include these to give additional information to prospective builders.

The grade of the floor on the shop buildings should be somewhat above that of the surrounding land and streets to prevent entrance of water into the buildings. The minimum clearance between cars and posts, walls and other fixed parts of buildings should be 2 ft., increased on curves. Non-combustible construction materials are recommended. Corners and recesses where rubbish would tend to accumulate should be avoided. Insurance requirements are important factors in determining many other details of construction, and a study of the underwriter's regulations when planning may save many expensive changes later.

A study was made of the shops and equipment now being used by fifty electric railway properties. The results show that the number of cars operated by the various properties has increased to a much greater extent than the facilities for maintaining them. The committee recommends that a liberal allowance should be made always for growth. In arriving at the area of a proposed shop, it should be borne in mind that the particular type of equipment to be handled and the effect of local conditions should be carefully considered. For instance, a property which contemplates manufacturing cars or car parts should allow additional space for this purpose and an interurban property having but a few heavy cars must provide more space per car.

In the arrangement of departments the following considerations should govern: (1) Cars should progress from motor and track repair shops to carpenter shops and thence to paint shop; (2) have as few isolated departments as possible; (3) have what may be termed the "Centralized Shop Plan"; (4) locate office to permit the master mechanic to keep in touch readily with his various departments; (5) arrange departments to afford economical handling of material and apparatus.

The actual areas of departments in the typical layouts are as shown in the tables which appear at the bottom of this page.

Generally too little space has been allowed between track centers. Both the equipment committee and this committee believe 16 ft. is a desirable spacing and that it should not be less than 15 ft. This does not apply to inspection pits in carhouses, which matter is covered in the 1919 buildings and structures committee report on design of carhouse inspection pits.

For smaller shops undoubtedly ladder tracks are to be preferred. For a moderate sized shop local conditions often dictate which shall be used. For a large shop a combination of the two is often desirable as it gives additional flexibility and speed in handling cars through the shops. For a small number of tracks the first cost of a ladder track will be lower, while for a large number of tracks the transfer table will cost less. In designing a new shop layout it will be well for the engineer to make up detailed estimates covering both and then make a study of the advantages of each to ascertain which will be best adapted to his particular case.

Some companies have had trouble with transfer tables due to the use of old discarded motors to drive them and on account of improper design or construction. If the transfer table is to be used it should be carefully designed and ruggedly built. Transfer tables are of the pit type or flush type. The pit type is less expensive and more desirable. Whether the transfer tables should be in the open or under cover depends on climatic conditions. Where there is much snow and ice it is well to have them under cover.

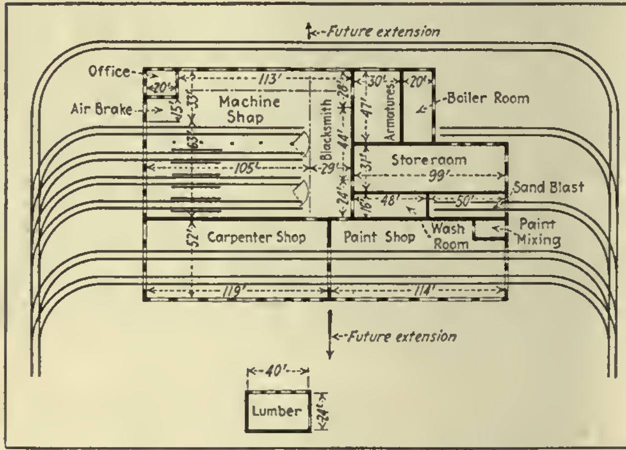
The subject of pits was thoroughly discussed by both the equipment committee and the buildings and structures committee, and it is recommended that in a repair shop to accommodate modern equipment pit space should be kept to a minimum. Either open or closed pits may be used. The type which appears more desirable at present is the open type with the devil strips covered except at wheel-changing pits. With such construction the workmen can move from one track to the next without difficulty. Pits vary in depth from 4 ft. 6 in. to 5 ft. When conditions require, tile covered with stone or washed gravel may be used to drain subgrade. Sump should be connected to the sewer and the floor sloped to the sump.

The principal types of illumination used in electric railway shops are:

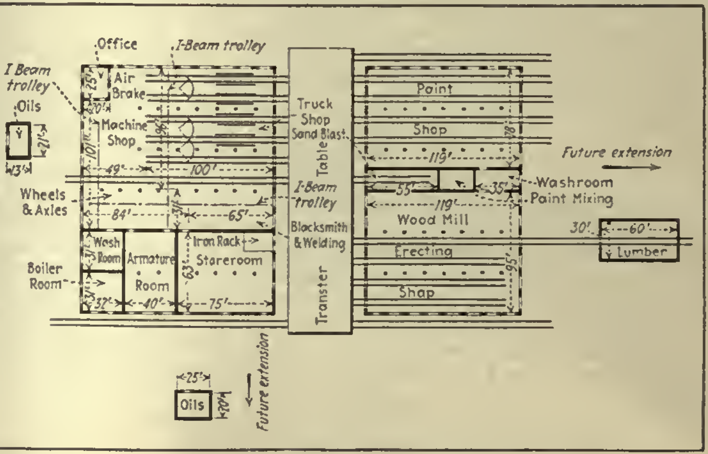
1. General lighting, secured by a system giving uniform intensity throughout a shop without regard to machines or work; it approaches more nearly "daylight" conditions than any other.
2. Localized lighting, secured by single units suspended over individual working planes.
3. General and localized lighting, a combination of the first two types.
4. Modified lighting, secured by suspending lighting units so that the maximum amount of illumination will be received on the most important working planes.

Individual drive of shop machinery has many advantages over belt drive so far as building construction and natural lighting is concerned. Especially is building construction affected when the machine tools are of a heavy type, which means a rigid support for line shafting. There are other advantages, such as continuity of service and general economy in operation.

The site for the repair shops should have sufficient area to provide for outside storage and to permit of enlarging the buildings to take care of future growth. Many classes of materials, such as wheels, iron castings, lumber, scrap and the like, can be conveniently



TYPICAL SHOP FOR 150 CARS



TYPICAL SHOP FOR 250 CARS

Shop for 150 cars

Departments	Dimensions	Area	Per Cent Area
Overhauling and truck	63 x 105	6,615	21.7
Machine, wheels and axles	(33 x 113) (5 x 29)	3,584	11.7
Blacksmithing and welding	29 x 44	1,276	4.2
Air brakes	15 x 21	315	1.0
Office	17 x 20	340	1.1
Armature	47 x 30	1,410	4.6
Carpenter and mill	119 x 52	6,188	20.3
Paint	(114 x 52)- (14 x 21)	5,634	18.5
Paint mixing	13 x 20	260	0.9
Sand blast	16 x 50	800	2.6
Storeroom	31 x 99	3,069	10.0
Oil house	13 x 21	273	0.9
Washroom	16 x 48	768	2.5
		30,532	100.0

Shop for 250 cars

Overhauling and trucks	96 x 100	9,600	19.2
Machine, wheel and axle	101 x 49 31 x 35	6,034	12.1
Blacksmithing and welding	31 x 65	2,015	4.0
Air brake	26 x 28	728	1.4
Office	20 x 25	500	1.0
Armature	40 x 63	2,520	5.0
Carpenter	119 x 65	7,735	15.5
Wood mill	119 x 30	3,570	7.1
Paint shop	119 x 78	9,282	18.6
Paint mixing	16 x 27	432	0.9
Sand blast	16 x 55	880	1.7
Storeroom	63 x 75	4,725	9.4
Oil house	20 x 25	500	1.0
Washroom	31 x 32 16 x 35	1,552	3.1
		50,073	100 0

stored outside, and this is undoubtedly better than to have them occupying valuable space under the roof. In addition, it is common practice to make use of the shop yard for storing track material, so the plot of ground should be considerably larger than the shop buildings.

The shops should be so located as to reduce non-revenue mileage and obtain a steam road connection. The latter, while not essential, is a great convenience in unloading carload lot materials.

The committee recommends the continuance of the study of the shop design by next year's committee. The committee was D. E. Crouse, chairman; M. V. Haulard, N. E. Drexler, J. R. McKay, S. J. Steiner, B. P. Legare, E. H. Berry, James Link, B. R. Brown, and L. L. Newman.

H. B. Doyle of Philip Kobbé Company, Inc., New York, presented an address dealing with the correct method of purchasing railway supplies. An abstract of this paper is published in another part of this issue.

The joint report on wood preservation as prepared by the committees on buildings and structures, power distribution and way matters, was presented in abstract by Howard H. George, Public Service Railway. Reference to this report is given on page 634 under way matters.

Following the presentation of this report, letters commenting on the report were read by P. R. Hicks of the Service Bureau of the American Wood Preservers' Association and Ernest Bateman and George W. Hunt of the United States Department of Agriculture Forest Service.

These letters set forth the importance of the subject and the need for careful consideration.

Thursday's Session

The first matter taken up by the Engineering Association at its final session Thursday afternoon was the report of the committee on unification of car design. This was presented by H. H. Adams, chairman, and the essential points are given in the following abstract.

UNIFICATION OF CAR DESIGN

The committee was appointed to study the various types of constructions, as given in data collected, to obtain, if possible, a uniformity in dimensions and design, such as post centers, height of window rail or arm rest from the floor, height of car from under portion of sill to top of roof, type of roofs, etc. Once these dimensions and designs are established, it will be thoroughly possible to get a uniform size of glass, probably using standard glass which would not require cutting.

As to the length and width of cars, it is thought that a width corresponding with the dimensions most generally used at the present time could be determined upon, and then, if other widths seem desirable, variations from the width used in the majority of cases could be made by even dimensions, say by increasing or decreasing the same by 4-in. increments. As far as the length of the cars is concerned, this could be varied by the addition or deduction of one or more window lengths.

The above instances are cited as showing the possibilities presented, and it is believed that by studying this subject carefully it will be possible to bring about a uniformity of design that will be of great value to the member companies in purchasing new equipment and to the car builders from the standpoint of having uniform practice to work to.

A summary of the data obtained by the committee was presented showing the maximum and minimum and the weighted average dimensions for the principal items tabulated, as applying to the closed, double-end, double-truck motor cars. The data from which this summary was prepared were studied and a certain amount of the information covering cars that appeared to be outside of the scope desired for consideration was eliminated. The summary submitted represents data obtained from 2,204 closed, double-end, double-truck motor cars. In addition, the committee received information covering 123 double-truck, single-end motor cars, 516 double-truck, center-entrance motor cars, 261 double-truck front-entrance and center-exit motor cars, 62 double-truck, center-entrance and exit and front-exit motor cars, 97 double-truck, double-end trail cars and 438 double-truck, center-entrance and exit trail cars, representing a total of 3,701 cars. The summary of the data for the 2,204 double-truck, double-end motor cars is submitted as illustrative of the variations that are encountered in present-day car construction. The cars from which the data given in this tabulation were taken represent recent design and what is considered good present-day practice.

Under the column "number of cars" is shown the number of cars from which the particular data were obtained. The variations in this last-mentioned column are due to the fact that in certain cases the information called for was not furnished. The committee recommends the continuation of the study of the subject unification of car design. The report was submitted by H. H. Adams, chairman; H. A. Benedict, J. W. Hulme, John Lindall, J. A. Brooks, G. L. Kiepenberger, and V. R. Willoughby.

The discussion of this report was opened by G. L. Kippenberger, St. Louis Car Company. J. W. Hulme, International Railway, Buffalo, said he felt that all equipment men realized that there is a large field for the unification of car design, but the subject as to how far operating companies are willing to go in developing a standard car, or in adhering to any standard recommended, is one that he believed would be hard to enforce. However, there should be some good method of bringing the desirability of standard dimensions before the equipment men, and Mr. Hulme felt that such steps could be best taken at the time that new equipment was purchased.

Frank R. Phillips, Pittsburgh Railways, said that he could see no valid reason for spending so much time in standardizing things that require changing so frequently and he felt that even if a standard car was ultimately adopted, most railway men would still adhere to the types which they already had in service. Mr. Phillips gave several illustrations as to troubles that might occur if the dimensions of car bodies were increased or decreased by increments. One example was that of the aisle space, which is very important, and the decrease of this by even so small amount as a fraction of an inch is not desirable.

Mr. Phillips referred to the relative merits of the arch and monitor types of roof construction, and suggested that in any study to be made very extensive experiments would be necessary to arrive at definite conclusions regarding the relative amounts of ventilation to be obtained from the two types. He referred to some extensive experiments made by the Pittsburgh Railways, in

DOUBLE-TRUCK, DOUBLE-END MOTOR CARS

	No. Cars	Maximum	Minimum	General Average
Length over bumpers	1,428	50 ft. 10 in.	37 ft. 5 in.	47 ft. 2 11/16 in.
Length over corner post	2,105	41 ft. 4 in.	25 ft. 0 in.	32 ft. 11¾ in.
Length over platform or vest	2,105	8 ft. ¼ in.	4 ft. 6 in.	6 ft. ⅜ in.
Width over posts	2,204	8 ft. 9⅜ in.	7 ft. 10¼ in.	8 ft. 4 in.
Width over sills	2,204	8 ft. 9½ in.	7 ft. 7⅜ in.	7 ft. 2¼ in.
Width of platform over crown	2,104	7 ft. 11¼ in.	6 ft. 4 in.	7 ft. 1 5/16 in.
Post centers	2,154	36¼ in.	28 in.	30¼ in.
Height of steps (from track) first	2,204	18⅞ in.	13 in.	14 5/16 in.
Second	2,204	15⅛ in.	11 in.	12⅝ in.
Third	202	11 in.	10 in.	10 in.
Height platform to floor	1,428	11¼ in.	0 in.	9⅛ in.
Height floor to belt rail	2,160	31½ in.	23 5/16 in.	26⅜ in.
Height floor to bottom of letter board	2,160	6 ft. 8⅛ in.	5 ft. 3 11/16 in.	6 ft. 3⅝ in.
Height floor over top rail	1,897	7 ft. ½ in.	6 ft. 2⅜ in.	6 ft. 7 in.
Height floor over roof	2,158	8 ft. 9 3/16 in.	7 ft. 7 in.	8 ft. 3 in.
Height bottom sill over roof	1,426	9 ft. 5 3/16 in.	8 ft. 3 5/16 in.	8 ft. 10 5/16 in.
Underside of headlining to top of roof	1,734	7⅛ in.	2¼ in.	4 3/16 in.
Height from top of roof over top of trolley board	1,426	4¼ in.	1½ in.	2¼ in.
Size sash glass, bottom	2,160	....	....	26⅜ x 22¼ in.
Size sash glass, top	2,160	....	....	26 7/16 x 11¾ in.
Over-all length of transverse seat	1,386	38 in.	34 in.	36 13/16 in.
Width of seat cushion	1,363	18 in.	16 in.	17 13/16 in.
Length of seat cushion	1,145	34½ in.	30 in.	33¼ in.
Height seat back	1,255	22 in.	16 in.	18 13/16 in.
Center to center seats	1,260	32½ in.	28 in.	30 1/16 in.
Sheet steel sides-gage	658	No. 7	No. 16	No. 12
Bolster centers	1,327	27 ft. 9 in.	16 ft.	21 ft. 4 9/16 in.

which it was found that with an arch roof a total of thirty-two ventilators were necessary to give the same ventilation as was obtained from the monitor-type roof, and with the installation of such a large number of ventilators the roof construction was in reality a monitor type.

R. H. Dalgleish, Capital Traction Co., Washington, D. C., said that his railway had also made some very extensive experiments as to the relative merits of the arch and monitor type roofs and that it found better ventilation could be obtained with arch roofs.

H. H. Adams, Chicago Surface Lines, said that the committee had not considered the subject of standardization of cars, but had endeavored to make accommodations which would ultimately lead to some uniformity out of the present chaotic conditions. Referring to the discussion of arch and monitor-type roofs, he said that in Chicago a very satisfactory system of ventilation had been obtained in connection with arch-roof cars.

John Lindall, Boston Elevated Railway, said that he considered the subject of the unification of car design to be very important, but that he feared that it could never be covered in such a manner as to produce a standard car. He said that he personally was an advocate of the monitor type of roof construction, as experience in Boston had indicated that roofs of this type, at least have the appearance of better ventilation and that was all that is necessary to satisfy the traveling public.

The report of the committee was approved with the suggestion that it be continued by next year's committee.

The report of the committee on equipment was then presented by Daniel Duries, chairman. An abstract of this report follows.

EQUIPMENT

The committee reported on twelve subjects:

1. Brake Shoes, Brake Shoe Heads, and Brake Shoe Keys—The three standard designs adopted in 1916 were revised. These included a brake head, shoe and key for 3-in. tread contour A1 and 3½-in. tread contour A2 wheels of a diameter 33 in. to 36 in.; a brake head, shoe and key for 2½ in. tread wheels, contours B1, C, D and E1, 28 in. to 34 in. in diameter, and a brake head, shoe and key for 2½-in. tread wheel contours B1, C, D and E1, 21 in. to 26 in. in diameter to accommodate wheel flanges ranging from ⅝ in. to ¾ in. in height and ⅞ in. to 1 in. in thickness. Two additional designs of brake heads, shoes and keys were presented, namely (a) for 2½-in. tread wheels. contours B1, C, D and E1, 28 in. to 34 in. in diameter, and (b) for 3-in. tread wheels contours B2 and E2, 24 to 26 in. in diameter to accommodate wheel flanges ¾ in. in height and ⅞ in. to 1 in. in thickness. Limit gages for the brake heads and shoe designs included in this report were also presented. These limit gages are practically the same as those adopted in 1916, but have the gage for maximum width of end lug on back of shoe and minimum space between end lug and flange of shoe omitted, as these are not necessary with the recommended designs.

2. On Standard Tread and Flange Contours for Steel Wheels — The committee resubmitted the eight designs suggested in 1920. Various questions raised regarding these designs were investigated by the committee and were found to present no obstacle to their adoption.

3. Standard Contour for Cast Iron Wheels—The Association of Manufacturers of Chilled Iron Wheels submitted to the committee recommended contours, but after discussion with other committees of the Engineering Association the equipment committee recommended no adoption of standards at this time but that the subject be continued next year.

4. Specifications for Solid Wrought Carbon Steel Wheels—A careful study of the present specification indicated that the Class B tolerances were not being used and these were omitted from the specification. Additional changes conform with the specification of the American Society for Testing Materials. It was recommended that it be adopted as standard in place of the present specification.

5. Helical Gears — Responses to a questionnaire indicate that this type of gearing is being more generally used than ever before. It is well liked, though in most cases it has not been in service long enough to afford conclusive results. The committee recommended that this be given attention by the next committee.

6. Car Arrangement and Design — Considerable work was done by the committee on this subject, but no definite conclusions were reached on account of the limited time available. The committee recommended that all information collected be turned over to a special committee recently appointed and that future study and work be done by it.

7. Life of Wearing Parts—The committee investigated the life of seven equipment parts, namely, trolley wheels, steel wheels, brake shoes, gears, pinions, armature bearings and axle bearings. The information obtained is included in the equipment report in sixteen tables.

8. Personal Observations On the Life of Wearing Parts and Shop Practices— The committee felt that such information would obtain greater publicity and reach a wider circle of men who are particularly interested in this subject if published regularly in technical publications rather than as a part of each year's equipment committee's report. The suggestion of obtaining a reel or two of motion pictures appeared inadvisable at this time due to the high cost of providing the film.

9. Current Lightning Arresters — A study was made in conjunction with the power distribution committee. The The design and method of installation of car arresters was covered by the report of the 1915 committee. The present committee brough the history of lightning arresters up to date and made seventeen recommendations regarding car and line equipment, including the following:

Many properties are having lightning damage due to improper installation or to not having sufficient arresters installed; others are not protected by choke coils or use arrester wiring of too large resistance. These points should be given special consideration and every car in lightning territory should be equipped with arrester and choke coil. Double-end cars should be equipped with two.

Arrester wiring should be No. 6 or larger with soldered joints and not placed in metallic conduit. Connections to arrester and from arrester to ground should be as short and straight as possible.

Line arresters should be placed at each feed tap, with not less than five to the mile. They should be grounded to either earth or rail, but not to both, and the negative wire down the pole should be protected by a wood molding.

10. Revision of Standards and Specifications — This year's committee had several meetings with the committee of the American Gear Manufacturers' Association in order to harmonize the specifications for gears and pinions of the two associations. The equipment committee revised the following specifications and recommended that they be adopted as standard:

Recommended specification Et-15a, specification for case-hardened forged steel gears.

Recommended specification Et-15a, specification for quenched and tempered forged carbon steel gears.

Recommended specification Et-16a, specification for case-hardened forged steel pinions.

Recommended specification Et-17a, specification for quenched and tempered forged carbon steel pinions.

The specifications as revised are acceptable to the American Gear Manufacturers' Association and will undoubtedly be adopted by them following favorable action by the American Electric Railway Engineering Association. The committee recommends that thes specifications as revised be adopted as standard specifications.

11. Curved Contours for Treads of Wheels — The committee co-operated with the way committee, and some of the members of the equipment committee turned wheels to a curved tread and placed these in service. Records are being kept that will show the results which can be obtained from curved contours. The equipment committee is of the opinion that it would be quite a difficult matter to turn wheels with curved contours and doubts the advisability of adopting them as standard. However, it agrees that this subject is of sufficient importance to warrant further investigation.

12. Typical Shop Building, and Shop Layout — The committee co-operated with the buildings and structures committee and furnished information and tables in regard to the amount of space required for the various departments, the proper arrangement of departments consistent with modern routing of work through the shop and the facilities necessary to accommodate modern equipment. As a result of the various studies and the information obtained, a rather extensive report on this subject is included in the report of the committee on buildings and structures.

The equipment committee's report was signed by Daniel Durie, chairman; H. A. Johnson, Vice-chairman; Walter S. Adams, H. A. Benedict, R. H. Dalgleish, James C. C. Holding, Thomas R. Langan, Frank H. Miller, C. N. Pittenger, E. D. Priest, C. F. W. Rys, F. W. Sargent, Charles F. Scott, Karl A. Simmon, C. W. Squier and J. M. Yount.

The disposition of the equipment committee's report was opened by N. B. Trist, Carnegie Steel Company, who referred to the subject of design of tread and flange contours for steel wheels. He said that if the standards were increased in number, by three, to take care of the objection raised by one railway, the standards would make provision for all the large users of steel wheels. He personally felt that this should be satisfactory not only to the railways but to the manufacturers as well, and that beneficial results would be obtained if the railways would only adhere to the standards as adopted.

H. H. Adams said that two very important subjects regarding standardization had been presented by this year's committee. These were brake shoes and tread and flange contours. He felt that the report was a very valuable one and that this year's committee had presented conclusions that would be of far-reaching effect. Referring to the matter of helical gearing, Mr. Adams said that results from the use of this gearing had led to the development of a new shape of tooth, and whether this is applied to either spur or helical gearing a great step in advance has been made. Another part of the work that he considered valuable was the obtaining data on the life of wearing parts. He felt that this work could be profitably continued.

R. H. Dalgleish discussed the recommendations of the committee in regard to tread and flange contours, and said that the present recommendation of the committee was to increase these so as to provide a total of eleven contours instead of eight as shown in the printed report. This subject had not yet received the approval of the standards committee, but if this meeting approved it the obtaining of further approval by the standards committee would be taken up at the next meeting. Mr. Dalgleish outlined the experience that he had had in a trial of curved contours on wheels in service on his lines. He exhibited several graphs which had been made on these wheels after 21,000 miles of service. He felt that present experiments are insufficient to permit definite conclusions but that the subject could profitably be continued by succeeding committees.

K. A. Simmon, Westinghouse Electric & Manufacturing Company, referred to the subject of wearing parts, stating that the suitability of all equipment for any service could best be shown by such data and that these were particularly valuable to the manufacturers of railway equipment. In analyzing the information contained in this report he had found several apparent inconsistencies in the life obtained from the same parts under almost identical service conditions. He felt that this emphasized the fact that the methods of keeping records by the different railways were not uniform. He suggested that a subject could be profitably added to those considered by future committees that would ultimately lead to some recommendations as to standard methods for keeping records.

J. C. C. Holding, Midvale Steel & Ordnance Company, urged the adoption and use of the committee's recommended wheel contours. G. W. Lyndon, Association of Manufacturers of Chilled Car Wheels, pointed out that standards for cast wheels are in use for steam roads, for industrial companies and for foreign shipments, but there is none for electric railway use. He offered to cooperate in any way to create standards for the A. E. R. A. and urged a study for this purpose.

L. H. Frye, Standard Steel Works, who spoke for the American Society for Testing Materials, complimented the committee on the specifications for wrought steel wheels and said that the A. S. T. M. specifications would probably be revised at the next meeting to conform to the A. E. R. A. specification, as the changes made in the latter were substantial improvements. H. A. Miller, chilled wheel manufacturer, said he anticipated a tendency to work toward the M. C. B. standard tread and flange in the electric railway field. He commented that it is possible to manufacture concave tread wheels, but he could see no reason for such a design. The M. C. B. design has been revised in the opposite direction. He likened making a wheel tread concave because it wears that way to making shoes with run-down heels.

H. Fort Flowers, Differential Car Company, thought that wheels for curved-head rail should have more metal in the fillet between tread and flange to prevent the early wearing of thick and thin flanges. He appreciated that the final determination of the most economical contour would require a very long study and the trial of many different contours.

H. A. Johnson, Chicago, stated that he believed the association is now in a position to adopt as standard the recommended brake-shoe head, key, etc., and the eleven wheel contours. In connection with the latter, he explained that the standards committee had not acted on the wheel contours on account of certain objections which had since been removed. The convention could therefore adopt these contours subject to subsequent approval by the standards committee, which approval had been assured if the convention so voted.

Referring to the wrought-steel wheel specification, he explained that the A. S. T. M. specifications had been clarified in some respects and that the specification for the closer of two tolerances covered there had been eliminated as it was found that this was not used. The more liberal tolerance used does not require so much machining. As to the recommendations on helical gears he thought if adopted, this would be a standard that could also be adopted by the manufacturers.

DISCUSSION ON BRAKE SHOES, BRAKE HEADS, ETC.

F. W. Sargent, American Brake Shoe & Foundry Company, chairman of the sub-committee on brake shoes, heads and keys, said that the committee recommends as standards for this association the following revisions of the 1916 standards of brake shoes, brake heads and keys:

Plate 1.—Brake head, shoe and key for 3-in. tread wheel contour A-1 and for 3½ in. tread wheel contour A-2 for wheel diameters 33 in. to 36 in.

Plate 2.—Brake head, shoe and key for 3-in. tread wheels contour B-2 and E for wheel diameters 28 in. to 34 in.

Plate 3.—Brake head, shoe and key for 2½-in. tread wheels contours B-1, C, D and E for wheel diameters 28 in. to 34 in.

Plate 4.—Brake head, shoe and key for 2½ in. tread wheels contours B-1, C, D and E for wheel diameters 20 in. to 26 in.

Plate 5.—Brake head, shoe and key for 3-in. tread wheels contours B-2 and E-2 for wheel diameters 20 in. to 26 in.

The 1916 standard shows the forked brake head with reduced bearing on each side of the shoe lug, and with narrow toes straddling the end guide of the shoe.

Due to the limited contact of head to shoe, there is excessive wear of the head, and as the toes are worn down, there is an uneven distribution of pressure on the shoe. The shoe becomes loose on the head and wears out of true, resulting in heavy scrap weight. The life of both head and shoe are reduced and maintenance cost increased.

The 1921 design of brake head overcomes this trouble by increasing the area of contact between shoe and head, providing a head with solid ends, with practically a continuous contact with the back of the shoe, supporting the shoe from end to end, and maintaining a uniform pressure, ensuring a true wearing head and shoe.

Considering the motor shoes and heads, the 1916 design gives an area of contact of 7.9 sq.in. between head and shoe, while the 1921 design provides 17.5 sq.in., an increase of 123 per cent for the broad tread wheels. In the case of the narrow tread wheels, the 1916 head shows 5.5 sq.in., as compared with 12.2 sq.in. in the 1921 design, an increase of 153 per cent. A similar relation exists with the pony shoes and heads.

The 1921 design of head provides a continuous support for the way, which prevents loose heads and keys, and reduces wear of all parts. The key way in both head and shoe have been reduced to give as little side play as possible between head and shoe. In addition the solid square ends of the brake head prevent the shoe from getting twisted on the head and wear unevenly.

To accommodate the solid end brake head, the end guides on the 1921 design of shoe have been omitted. This makes a better shoe and does away with the trouble often experienced with obstruction in the narrow space between end guide and back of flange, which is difficult to clean and gets clogged with dirt, preventing the toes of the forked head going into place.

The taper has been removed from the shoe face in the 1921 design and the tread made flat. If only new shoes were applied to newly turned wheels, the taper would be all right, but the average wheel is a worn wheel. Wheels start with taper, then wear flat and finally concave. The straight or flat faced brake shoe makes a better fit on a greater number of wheels in service than shoes with taper; moreover, the tendency of shoes to pull off the wheel is much less with the straight than with the taper tread. For this reason, the straight face shoes have been preferred and give better service, that is, lower scrap weight.

Formerly brake shoes were made with a single or continuous face curvature. To avoid the use of the improper curvature shoes on a given size of wheel, as well as to reduce the number of patterns and stock to be carried, the composite face curvature has been adopted in the 1921 design of brake shoes. The middle half of the shoe is curved to fit the smaller diameter wheel, while the outer quarters of the shoe face are curved to fit the large diameter wheel. The shoe thus fits the larger wheels on the ends, and the smaller wheel in the middle, and makes a better average fit on wheels of intermediate diameters, and a single pattern only is required to cover the range in wheel diameters noted.

The report was further discussed by Thomas R. Langan and F. R. Phillips.

ELECTION OF OFFICERS

Following are the officers of the Engineering Association elected for the ensuing year:

President.—C. S. Kimball, Engineer of Way and Structures, Washington Railway & Electric Co., Washington, D. C.

First Vice-President.—L. C. Datz, Birmingham, Ala.

Second Vice-President.—H. A. Johnson, Chicago,, Ill.

Third Vice-President.—A. B. Stitzer, New York City.

Secretary-Treasurer. — James W. Welsh, New York City.

Members of the Executive Committee.—C. H. Cark, Cleveland, Ohio; R. C. Cram, Brooklyn, N. Y.; Charles R. Harte, New Haven, Conn.; Daniel Durie, Connellsville, Pa.

Engineering Association Executive Committee Meets at Atlantic City

A MEETING of the executive committee of the Engineering Association was held on Oct. 2, with the following in attendance: President W. G. Gove, Secretary J. W. Welsh, H. H. Adams, L. C. Datz, H. A. Johnson, C. S. Kimball, M. B. Lambert, F. R. Phillips, E. H. Scofield and A. B. Stitzer.

After the reading of the minutes of the last meeting by Secretary Welsh, he brought up the question of the procedure to be followed in connection with the activities of the American Engineering Standards Committee. After discussion it was decided that the representatives of the association on the American Engineering Standards Committee sub-committees should report on matters of interest to Secretary Welsh. On receipt of information from the representatives, the secretary will report to the executive committee, at the same time sending full information to the standards committee, and informing the membership through *Aera* of what is going on. This will give the standards committee and the members at large an opportunity to transmit to the executive committee any suggestions which may bear upon the subject in hand, in time for the committee to consider such suggestions before taking action upon the recommendations of the representatives. It is understood that the information furnished to the membership will be in abstract form, as it is likely that voluminous material will develop in the conferences held under the auspices of the American Engineering Standards Committee.

It was further decided that continuous reports of progress as to the development of "American Engineering Standards" should be published in *Aera*.

A report was received from Secretary Welsh as to plans for co-operation with the American Association for Municipal Improvement and the line and materials section of the Associated Manufacturers of Electrical Supplies. Such co-operation was approved by the executive committee.

L. C. Datz then reported for the committee on subjects to the effect that several meetings had been held and tentative assignments had been made to all committees. He suggested that these assignments be reported to the association, after the discussion of the several committee reports respectively.

Mr. Gove spoke of the reorganization plans presented to the American Association and raised the question in connection therewith as to the status of engineers in the employ of non-member companies with respect to committee work. After discussion it was agreed that no great hardship will be done the association by the putting into definite form the practice followed for some years, namely, by insisting that committee work be restricted to the employees of member companies.

Some discussion followed as to the effect of non-payment of committee expenses by the association, in so far as it relates to attendance upon committee meetings by committee members. A motion was passed to the effect that this subject be referred to the incoming executive committee, with a view to possible future payment of committee members' expenses as soon as the financial condition of the association warrants such action.

Publicity Men's Meeting

A MEETING of the publicity men at the convention was held in the Chalfonte on Wednesday afternoon. Labert St. Clair, publicity manager of the association, presided. About twenty-five publicity men and executives of companies were present.

President Gadsden, who was first introduced, said that among the causes of the present trouble with the electric railways that of unwillingness to tell the public took first place. This was an old idea and it had taken about thirty-three years to overcome it. Some persons believe the duty of the publicity man was to write advertisements occasionally. That, however, is not his real work. The speaker's understanding of the fuctions of such a man was that he should be the medium of information between the public and the company at all times. If he was always ready to give facts, the newspapers would rely on him. In this way he could be of value to the company even if he never wrote anything. He hoped these meetings would be continued each year.

W. A. Draper, Cincinnati, said that he always took a great interest in publicity as he was once in the newspaper business himself. The best way was for the president himself to be the publicity man, but as his duties prevent that, it was necessary to have someone to act for him.

Barron G. Collier, chairman of the publicity committee, said that the railway companies now realized the policy of the big stick and seclusion was not desirable. It was only necessary to get the truth before the public so that the railroads would have a square deal. He referred to the successful use for publicity which can be made of spaces in the car not occupied by car cards.

Britton I. Budd, Chicago, spoke strongly in favor of newspaper advertising. Bernard G. Mullaney followed with an interesting discussion on publicity in general and the work of the Illinois Committee on Public Utility Information. Other speakers were J. K. Punderford of the Connecticut Company; H. O. Allison, Beaver Valley Traction Company; A. H. Ferradou, Washington Railway & Electric Company; R. F. Gorman, Harrisburg Railways, and W. O. Clure, Twin City Rapid Transit Company.

Transportation & Traffic Association Proceedings

Attention of Convention Focused on Reduction of Accidents, Traffic Regulation, Transportation Merchandising and Employee Training—L. H. Palmer, Baltimore, Was Elected President—Desirability of Study of Possible Improvements in Organization Was Suggested

R. P. STEVENS
Retiring President

L. H. PALMER
Newly Elected President

THE first session of the Transportation & Traffic Association was called to order shortly after 2:30 p.m. Monday. The first order of business was the annual address of the president, R. P. Stevens. After referring to the work and reports of the different committees of the association and to the work of Mr. Welsh, Mr. Stevens said, in part:

SUGGESTIONS OF PRESIDENT STEVENS

At this time also I would like respectfully to call the attention of the incoming president and executive committee to the following suggestions which occur to me as helpful for the future of our association.

I would recommend that the new executive committee appoint a committee to consider changes in the constitution and by-laws of the association that we may avail ourselves of the experience gained in conducting the affairs of the association in the past.

I feel that only one vice-president is necessary and that provision should be made for a senior member of the executive committee to become ex officio acting president, in event of both president and vice-president being unable to attend to the duties of the office, until the vacancy has been filled in the regular way. This, to my mind, would make an increase in membership of the executive committee advisable.

I would recommend that a plan be considered for the appointment of chairmen of committees, whenever possible, from the membership of the preceding year's committee; that the first vice-president be ex-officio the chairman of the subjects committee for the ensuing year; that the custom be adopted of this committee meeting before and again immediately after the convention and that at the meeting of the executive committee directly after the convention all committees be appointed forthwith so their work may be started before the holidays.

I would recommend a Transportation & Traffic Association committee to consider the transportation phase of trackless trolley and motor bus operation, a subject now occupying an important place in the affairs of our companies, and also a committee to take up the question of the bus competition from a transportation viewpoint.

Revival of the committee on one-man car design and operation and continuance of the committee on freight and express traffic appear to me desirable, and I would further recommend consideration of a suggestion to the *Aera* advisory committee that more space in *Aera* be devoted to the education of transportation employees and that a definite plan to this end be adopted.

In closing, I want to suggest that the business of handling the transportation and traffic problems of an electric railway property is developing rapidly—changing constantly—and that we must keep not only abreast but ahead of the swiftly shifting conditions surrounding public utilities.

In comparing the situation today with that even so late as a year ago one thought that impresses me as most significant is that the theories of radical socialism, which were so menacing to our operations a short time ago, are now wholly discredited and have ceased to be a contagion adversely affecting the minds of either our employees or our patrons. The feeling of "damn the trolley company" surely has subsided, so that our communities are appreciating not only the convenience but the absolute necessity of trolley transportation. This changed attitude has helped our employees to realize the position which they occupy in the industry and to see the limits to which they can aspire in regard to wages and working conditions, whereas in the recent past, in many instances, they failed to realize that there was any limit at all, so far as they were concerned.

Some companies are fast getting their houses in order, so that now they can help make effective for good over the entire country the interest that has been aroused in the utility situation, a self-interest that can be, and should be, established in the minds of the people in such a way that utility operation will be recognized as a business founded upon a national principle rather than on local caprice. Then the utility will cease to be a political football. The one sure, safe and direct way to bring this about is through the employees of the transportation department, the employees who come into constant contact with the public.

The transportation and traffic employees of the electric railways of the country have a latent power hardly realized—certainly never utilized. This force, properly led, can carry any objective when its cause is founded on right. It can overcome the might of politicians, who gained their now declining power through our failure to take the aggressive and to use to the fullest extent the facilities we have at hand.

J. P. Barnes, president Louisville Railway moved that the recommendations in the president's address, so far as they are related to changes in organization, be referred to the incoming executive committee, and those relating to subjects to the committee on subjects.

EXECUTIVE COMMITTEE REPORT

In view of the fact that this report contained merely a review of the minutes of the various executive committee meetings during the year it was not read in full.

The report outlines in full the work laid out by the committee on subjects for the year, practically all of which was accomplished and is given in the reports of the committees following.

The reports of the secretary and treasurer were then read. The secretary's report showed on Sept. 30, 1921, 114 individual members and 728 company section members. The total ex-

COMPANY MEMBERSHIP RECORD

	Railway	Manufacturing	Tota
No. of members Nov. 1, 1920	355	237	592
Less resignations during year	9	22	31
Add new members during year	7	8	15
Net loss during year	2	14	16
Total members Sept. 27, 1921	353	223	576

penses for the year were slightly over $1,000.

The president then announced the appointment of the resolution committee and nominating committee. The former consisted of H. V. Bozell, C. L. Van Auken and W. H. Boyce; the latter of W. H. Sawyer, F. R. Coates and E. C. Spring.

The president then called for the report of the committee on merchandising transportation. It was presented by Mr. Coates. An abstract follows:

SELLING TRANSPORTATION THROUGH EDUCATION AND ADVERTISING

It was agreed that, in view of the thoroughness with which many of the subjects properly coming within this committee's scope were covered last year, the committee should this year pick those several suggestions which seemed most feasible for immediate enlargement and most necessary to put into immediate practice and that it should endeavor to find a definite and specific means for adopting as many of them as possible generally among the various railway organizations in the country.

With this in mind, the recommendations of the committee may be summarized, first, under the head of "education of employees" and then under "advertising."

The first phase dealt with under these headings, the most important of which, in the opinion of the committee, was "Courtesy." The committee has agreed, in substance, that the industry must actively educate its employees to a point where it can demand of them the courtesy and service which is essential to the industry's adequate development. The practical means of accomplishing this end is to sell the idea of service and courtesy to the executives and dispatchers, and to the inspectors immediately over the train crews, as well as to the platform men themselves.

It has been agreed by the committee that it is essential to the success of each individual company that the car rider understand many of the problems with which the company is faced. One important and practical means of conveying such information is to see that the employees who come in contact with the public are themselves acquainted with those problems and the means by which the company is hoping to solve them.

Noon-hour talks in shops and at division headquarters can also be adopted. In each individual property the method adopted will necessarily differ. Noon-hour meetings have proved feasible and highly beneficial in some instances, and it was the opinion of the committee that some companies would do well to make more extensive use of this means of reaching their employees directly.

The official publication of the Association carries in every issue much educational matter of which a large majority of the member companies are not taking full advantage. Some means might well be taken for disseminating these educational articles among a larger number of employees.

A third means of conveying to the employees information which should be helpful to them in understanding many company matters and make them generally better informed on the subject of company affairs, is the posting of pamphlets or bulletins at points of vantage at division points or at the shops. At times when men are standing about waiting for a change of shifts, posters or pamphlets about the bulletin board which are changed frequently, hold out a topic of conversation to the men, and it was the opinion of the committee that this is a very excellent means of imparting to the employees general information in a way that will ultimately react to the benefit of both the men and the company.

The co-operation of employees, to be most valuable, must be directed in definite channels. Company policies must be instilled in the minds of the employees. Employees must be convinced of the sincerity of the company in its desire to give every consideration to the employee's service and well-being. The formation of committees through which recommendations can come from employees and sometimes be worked out, have proved an excellent means to these ends. In many cases labor difficulties have been smoothed out and proposed schedule changes abandoned by the committee itself as not feasible, leaving the men entirely satisfied, whereas had the refusal come from the company there would have been increased dissatisfaction.

The second phase of the committee's recommendations dealt with the matter of advertising, first — directly, by means of newspapers, cards, circulars, time-tables, letters and moving pictures, and, second—indirectly, through employees' memberships in public bodies and civic associations and by company co-operation with national, state and local organizations and affairs.

It was the opinion of the committee that a way must be found to put suggestions and recommendations into effect and that the best means available is to add to the duties of the association publicity manager the work of assisting member companies in putting into operation such of these recommendations as are appropriate for any individual property.

After an elaboration of these points the committee discussed the question of advertising in newspapers, cards, circulars and time-tables. On this point it said that the car crews and other employees have for years read articles in the press which charge the electric railways with all sorts of improper practices, financially and otherwise. In general, they have not and do not now receive corresponding definite and clear-cut statements of facts proving that the contrary is true for the press does not give the same space to the public utilities side of the story that it gives to sensational statements of the demagogue. Again, it must be remembered that bad news and gossip spread faster than straightforward facts.

The real object of advertising is to sell, whether it be to sell an article, an idea or service. It is the opinion of some that "direct advertising" in newspapers can be made to sell more rides in off peak hours. Transportation can be sold just like gas stoves or electric lights or steam heat. Riding on street cars can be transformed in the minds of the public from an ordeal into a real pleasure, a happy pastime, and a form of helpful recreation. It is the opinion of the committee that this can be done by systematic intensive publicity. Advertising directly in newspapers to increase the sale of transportation has been carried on for at least ten years. Sample advertisements considered effective are then reproduced.

The committee declared that the fact should not be lost sight of that every act of each employee is an advertisement. Reputation, honesty, politeness, neatness, promptness, are all advertisements. Quality, price, frequency, everything is an advertisement, either good or bad. Intelligent propaganda would suggest the use of one of the greatest advertising mediums extant, namely, the street cars themselves.

Moving pictures, the committee declared have become the greatest aid to education that civilization has created. They offer today one of the greatest fields for advertising and are peculiarly adaptable to carrying the various types of message which the street railway industry must convey to its users and potential users.

There are two reasons why this is true. First—they reproduce incidents, events and ideas for high-minded people—the 85 per cent; second—moving pictures are projected under facilities ideal for concentration in that there is but one thing before the vision and the room is dark. It is for these reasons that moving pictures offer one of the best ways of putting ideas in the consciousness of human beings. It was the opinion of the committee that there are three ways in which moving pictures can be utilized to advantage by street railway industries. First—safety productions for the car-riding public and the company employees. Second—Publicity productions for the promotion of special financial and engineering problems, which require the approval of the car riders. Third—Industrial engineering productions to instruct shop employees and trainmen in efficiency methods. These three types serve entirely different purposes and are equally important. The safety production will aim to educate the car riding public as well as the car employees. Reports of the National Safety Council show that accidents tend to fall off considerably after every campaign for exercising greater caution. A series of safety reproduction films should show how accidents on and off a street car occur and how they may be prevented. The purpose should be to instruct the public as a preventative measure or assurance against accidents.

That type of film which may be termed a publicity production requires the utmost good judgment and foresight, and if wisely used, can pave and prepare the way for many otherwise difficult developments, extensions and improvements.

The third type of film production recommended pertains to shop and operating efficiency. The need for training in production is universally recognized. The type of training to be adopted should always concern itself with the development of men to see and understand the causes behind wastes, leaks, power losses, and injuries to equipment which continually occur. With this purpose in mind the methods can be developed from a study of the films to overcome existing inefficiency with regard to human time, machine time, power saving, preservation of equipment.

The most valuable asset a street railway can have on its books is the good will of the public, and to build good will and extend a company's radius beyond its present circle is its responsibility. Advertising is one of the mediums that will carry the character of its organization to its public and help form public opinion. The committee also emphasized the necessity for taking an active part in all civic affairs.

In conclusion the committee suggested that the association's publicity director might add to his duties the work of bringing to the attention of the industry from time to time, in his traveling, such of these recommenations as seem particularly appropriate and aiding them in the inauguration of any new or additional programs which member companies may deem feasible for adoption. It also suggests that *Aera* be asked to run a series of articles on the more important phases of this subject and that these articles be prepared especially for the consumption of the rank and file of motormen and conductors and others directly concerned in operating the cars. Companies having house organs can reprint these articles and gain widespread benefit while others may subscribe for sufficient copies of *Aera* to obtain fairly wide circulation among the trainmen.

The report is signed by J. H. Alexander, chairman, W. H. Boyce, F. L. Butler, H. C. Clark, F. R. Coates, A. H. Ferrandou, B. W. Frauenthal, A. L. Kempster, M. B. Lambert, A. Stuart Pratt, S. L. Vaughan and Elton Wilde.

DISCUSSION BY W. L. GOODWIN

Purposely assuming a critical attitude toward the sales ideas expressed in the report of the committee on merchandising transportation, W. L. Goodwin, assistant to the president, Society for Electrical Development, New York, began by stating that no one would question the ability of the executives in the electric railway field. The fact that the industry is in bad condition financially, however, indicates that the industry has either been badly directed or this ability misplaced. He considered that the main problem of the industry is one of salesmanship. Before the ideas of the committee can be carried out, he thought it would be necessary to reorganize the companies. The executives are thinking in financial, engineering and legal terms, and not attacking the problems from the sales viewpoint. The electric railway companies are in business to make money and the only way this can be done is to sell transportation. The commodity for sale is transportation regardless of the tool used to produce it. Some one man must be placed in charge of the sale of this commodity, and the sale of it at a profit.

As to the suggestion of the committee that courtesy is essential in selling transportation, Mr. Goodwin remarked that courtesy is a very elementary consideration and that he could not conceive of selling anything without courtesy. He said he had attended a great many important sales conferences and he did not recall ever having heard the matter of courtesy mentioned. Few trainmen realize that their function is to sell. He noted that the committee suggested getting the trainmen together on their own time and said that he would never think of asking men to attend a sales conference on their own time as this would be resented. If it is desired to re-train the men in sales work, this must be done on company time and attendance must be compulsory and not left to the volition of the men as suggested in the report. In hiring new employees, their first training should be in the principles of selling.

All through the report reference is made to advertising and publicity as selling work, but Mr. Goodwin emphasized the point that this is only a subdivision of selling. The spoken and the printed word, properly co-ordinated, are subdivisions of selling, which involves in addition, policy, quality of product, and various other elements. He said he knew of one company which is using extensive publicity in which the printed word does not agree with the company policy. The people feel this and the result is that the publicity represents time and money wasted.

Referring to the committee suggestion that the association publicity manager be made available to assist companies in their advertising and publicity work, Mr. Goodwin suggested that this man should be called the association sales manager and that his work should be to assist the companies in setting up a proper sales organization, after which the matter of publicity would follow as one of the functions of this department.

In the matter of educating the employees to sell, Mr. Goodwin said that this could not be accomplished unless the executives themselves first caught the spirit of selling. He took issue with the committee's statement that the remedy for discourtesy is dismissal, saying that the men were not to blame, that the fault lay with those above and that the men were working under wrong principles. He suggested that the title of conductor and motorman be dropped inasmuch as these are much misused terms and since a new title is sought in connection with the one-man car, substituting the man's own name on his cap and thus establish personal contact. He thought it would be a mistake to urge the sale of company securities to the employees in an effort to win their co-operation by this means, unless the management was absolutely sure of the safety of the investment and that it would earn a return.

Commenting on the list of subjects suggested by the committee for discussion in meetings of the employees, Mr. Goodwin thought that some of the most important had been omitted. The matters of policy, product and competition are the real topics that should be taken up in these sales meetings and of these, competition is by far the most important now. He suggested that a sales demonstration be included among the subjects, wherein an example could be given the trainmen of how to meet the arguments of the dissatisfied customer.

Mr. Goodwin also took issue with the suggestion of the committee that more space in *Aera* be devoted to the subject of training employees in the sales attitude. He said that he thought association journals had done more to retard constructive development in various industries than almost any other thing because they publish only those things that the members like to hear. He maintained that associations should put into their own publication only such matter as would not be accepted by the independent press. He urged greater dependence on the latter and less on the association magazine.

One of the most important tasks in obtaining sales effort from trainmen is to get a good understanding among them, and in fact among the executives, too, of what the problems are, for co-operation cannot be secured until such understanding is had.

In speaking of broad good will publicity campaigns, Mr. Goodwin mentioned the serious error made by another association in signing the campaign by the name of the association, which was unknown and meaningless to the public. He said this would apply also be such a campaign signed by the American Electric Railway Association. As to the noticeable absence of publicity in the industry, he said that this was due to the fact that there are no sales departments of the companies. If these were had this would be the greatest advertised industry in the world. Any advertising entered into must be continued, for the selling job is one that must go on for all time, and the terminable campaign can only be used for putting over some temporary idea. If companies were reorganized to include proper sales organizations, he believed that the condition of the industry would be greatly improved. He also took issue with the idea that the selling of transportation is selling a necessity for he considered it a convenience. A necessity is sold by sufferance while a convenience is sold by putting forth its virtues and meeting all competition.

DISCUSSION FOLLOWING MR. GOODWIN

Summing up the committee's report in a word, Harry Reid, president Interstate Public Service Company, Indianapolis, Ind., said it would seem that merchandising transportation is entirely a matter of proper public relations. He suggested the formulation of a public relations section of the association, modeled after the public relations section of the National Electric Light Association. He thought that the best method of developing proper public relations consists in giving satisfactory and adequate service rather than in proceeding on the theory that they can be developed by oral and advertised alibis and excuses. Good business management does not depend upon popular sympathy, nor can sympathy help very much in its attainment. There must be something of merit to sell. Through proper salesmanship and advertising success will follow naturally. The time has come when further increase in rates cannot be expected and everyone connected with the electric transportation business should cease referring to it as a "busted" enterprise. Nothing succeeds like success. Shabby clothes and run-down heels rarely bring forth very much sympathy. We have got to get our clothes pressed, our heels straightened and put on a prosperous appearance, even though it is somewhat feigned. Of course, a new suit of clothes and new pair of shoes may be rather difficult to pay for, but it is not so difficult to appear in the market with the optimism of a purchaser. In other words, "optimism" should be written in electric lights on our sign posts, thus pointing to success.

The property for which Mr. Reid is responsible fairly demonstrates, he said, the success of this bit of philosophy. Within the last five years through the purchase of additional equipment, the passenger receipts have increased 42 per cent and the freight earnings have increased from 6 per cent to 27 per cent of the gross business. The additional equipment was financed by the usual car-trust equipment method.

Continuing, Mr. Reid said that if the companies can continue to carry out the policy developed during the war of informing the public regarding the utilities, it will bring about good public relations, without which merchandising transportation is bound to fail. Left alone the cities will not realize or consider the importance of their transportation systems. Yet unfair treatment by city government will tend to destroy these systems and impair the prosperity and comfort of the citizens.

Selling transportation, whether street car or interurban transportation, is perhaps the most important phase of the work. The training of employees in this work is surely very essential to the success of any property. Co-operation and co-ordination of all departments are absolutely necessary. General policies and sales methods should be determined by the executive in charge and extreme care and rare judgment used in determining them. For the education of men to carry out these general policies costs vast sums of money each year.

Mr. Reid directed particular attention to the use of motion pictures, as recommended by the committee. The full importance of this powerful agency is likely to be overlooked unless special attention is paid to it. It was his notion that a very wide distribution and showing of films could be obtained at a comparatively small expense, if there were available pictures of a really instructive character, honestly setting forth the history and present-day problems of electric transportation. They could be shown in the public schools, community centers, Y. M. C. A.'s and even in the commercial theaters at practically no expense.

General publicity is an important factor in paving the way for effective sales work on the part of employees. The transportation systems of the entire country are suffering from a lack of honest, straightforward publicity. Does the public know the efforts that are being made to create and maintain the service they demand? Does the public know the cost of such service? Does the public realize that, because of adverse legislation, both by state and cities, the average investor refuses to buy public utility securities? Does the public know that petty politicians use the transportation facilities of their cities and states as means to stir up hatred and animosity? Tell the public the truth. Do we realize that we have all of these problems to meet? If so, how are we meeting them? Publicity and lots of it is necessary. Let the people know our troubles. Impress the importance of the transportation system and of their co-operation.

Let us look well into our organization. Is it a real organization? Does the head of every department have his duties clearly outlined? Are the departments co-operating properly? Are the employees in each department being properly trained and educated to carry out their part of the program? Are we making future heads of departments in our organizations? Are we endeavoring to fit our whole organization to meet the public squarely and fairly in the discussion of policies and rules which affect the public?

E. M. Walker, general manager Terre Haute Traction & Light Company, declared that merchandising or salesmanship in the last analysis is trading for a profit, and every true salesman or merchant has in mind his profit at the completion of the transaction. This is perhaps the reason why salesmanship is the missing link that has caused the non-success of the various forms of municipally owned or operated projects in public service. It has been well said that a government not only abhors a surplus but also is indifferent to a deficit. Therefore, if a government is not and can not be operated at or for a profit, why worry about salesmanship? One could take a course of lectures on baseball, but no man and no book could teach him how to hit the ball, and hitting the ball is the salesmanship of baseball. The champion home-run hitter is champion because he believes in himself, believes in the team he plays on, and knows that the man he works for will see that his profit is adequate and satisfactory. The all too brief story of the life and death of Jim Burleson, of El Paso, as recently told, did not convey the idea that Jim knew much about the problems of merchandising and salesmanship, yet he was a master. There was another Jim Burleson a quarter of a century ago on one of the suburban lines of Boston. In those days on a Saturday night a rather unruly crowd used to patronize the 11:30 train, which was regularly in charge of Dennis Collins. On nights when the run was in charge of a substitute this train was more than likely to become thoroughly demoralized, but Dennis had a way of selling the railroad to these boisterous rowdies that proved him a thorough believer in himself, in his work, and in his road. What the roads need is more Jim Burlesons. No doubt all railroads have a few, and the task of the sales manager is to pick out as far as possible men of the salesman type. This, of course, can not be done successfully when there are more jobs than men.

Continuing, Mr. Walker said that of perhaps equal importance in the merchandising of transportation is the matter of keeping abreast of the times by meeting the changing and evolutionary standards of speed and comfort in equipment. Companies can not meet 1921 demands with the standards of two decades ago. Many a property has been able by the generous introduction of the light-weight safety car to improve the quality and frequency of the ride, to keep down the fare, to increase the number of riders at least proportionately to the increased service, to stem the tide of the competing jitney bus, and finally, to live and breathe and to preserve the true semblance of real merchandising.

The speaker said that there are fields for salesmanship still unexplored. For example, how to get an increased number of riders interested in buying transportation when the companies need most to sell it—either by a reduced rate between certain hours, or by a free return ride in co-operation with a downtown sale of large proportions. Thus his own company several times this year in connection with Dollar Day Sales has put out through a large department store a limited quantity of street car tickets at a reduced rate—"a dollar's worth to a customer, while they last." These have been popular items with the store management and customers, and of course have produced something in popularizing the riding habit. The companies can not stop the increasing use of private automobiles but they can extend their efforts to make the automobile owner a short-ride prospect, as he has the riding habit more fully developed than the non-owner.

As to newspaper publicity, "The time to advertise is all the time." The trouble with many companies has been that in days of prosperity they have been too little inclined to think that they had things in common with the public. Then when dark days and trouble came, the public showed its disinclination to bother with the problem. Let us tell the public about the good as well as the bad, telling them the truth always, in which we believe just as implicitly as we believe in ourselves. After all, merchandising of transportation is a matter of men and methods, and there will probably be as many different methods as there are men. But wherever these methods are founded on knowledge of the business, truth, and an unfailing belief in oneself and one's work, that is the basis of true and successful salesmanship.

F. G. Buffe, general manager for the receivers, Kansas City Railways, thought a distinction should be drawn between the sale of a commodity and the sale of a service. If a man buys a razor he does not care particularly about the methods of the manufacture, but if he goes to a barber shop and buys a service, he is greatly interested in the methods of production. Railway transportation is a service, and the customer is concerned in the manner in which the motorman and conductor do their duty. Hence everything which enters into the equipment of a car is concerned with salesmanship. Opinions as to the desirability of employment on a railway have changed, and it is now sought after. The turnover is small, and the men are more anxious to study sales methods. While electric railway service had been declared by some people not to be a necessity, the speaker believed that it was now so recognized in Des Moines and other cities where the service had stopped. Everyone there now wanted the service restored.

Walter Jackson, Mount Vernon, explained that the London Underground Electric Railways Company had a "commercial manager" and described the extensive publicity carried on by the London company. It did not expect to get every dollar back which it spent, but the company knew that if it told every day about its service and why it wanted people to ride, the public would understand that the company was up-to-date. A railway manager should utilize every occasion for developing traffic. On a rainy day merchants would get out special notices about overshoes, raincoats, and umbrellas for sale, but though transportation was equally desirable on a rainy day, the railways did no special advertising. Most companies are unfortunate in that they sell transportation at all times at the same price. Youngstown has recently introduced a weekly pass, and the speaker described ways by which its sale is promoted. It had to be sold to people who wanted to take more than two rides a day, that is, to the voluntary riders, who wished to visit theaters, do shopping, etc., besides traveling to business. This riding was of course of reciprocal advantage to the theaters and merchants. The matter of advertising the pass was therefore taken up with them. As a result several department stores advertised the pass in their own newspaper space, and the theaters used slides with the company's selling slogan about the pass. The Y. M. C. A. evening school was also interested, and got out a poster which helped the sale to pass. Off-peak riding would be encouraged if someone realized that after the workers had left in the morning there were more people at home than were in the factories and stores.

In answer to a question by Mr. Lambert, Mr. Goodwin declared that the sales responsibilities should be put up to one man. It might be all right for people to think that riding was a necessity, but those in the organization should not hold that idea. He then told about the practice of the Electrical Jobbers Association where a member who does not attend the meeting loses his $5 fee, paid from a fund contributed by the members for that purpose. He also thought that where papers were printed in advance it detracted from the interest taken in them.

Britton I. Budd, Chicago, commended the report of the committee. He also said that the idea of a sales manager was a good one as it awakens the selling instinct in a railway organization, but it is impossible to divorce management from general oversight. Courtesy will be practiced by the men only if their supervisors and other officials are courteous. The rules should be such as to bring out what is best in the men. Like everyone else they like to be commended for work well done. Hence, if patrons are urged to report uncivility, they should be asked also to report good actions. In fact, if the request was confined to the commendations, it would be sufficient. It is impossible to overestimate the value of courtesy. If the men feel right toward the management, they will at all times defend it and put forth their best efforts for the company. The speaker was not sure if they would feel the same way towards a sales manager.

The speaker then described the methods followed by the Chicago, North Shore & Milwaukee in developing traffic. Solicitors are sent out far and wide. Illuminated billboards and other ways of soliciting traffic are used. The purpose is not to get the business of competitors, but to create business. In discussing the desirability of mutual understanding between manager and men, Mr. Budd then said that his company was going to have a series of educational talks given to the foremen of his companies on the history of the company. The speaker will be a professor of finance and the facts will thus be carried to the men. It is the hope that by means of these lectures the men can talk intelligently on the subject. In answer to a question he said that his North Shore line had a regular traffic manager.

Mr. Goodwin declared that Mr. Budd had the sales instinct and thus was the sales manager of his company as well as the president.

C. E. Morgan, assistant general manager, Brooklyn City Railroad, in referring to the question of service, emphasized the necessity of a careful supervision of schedules so that the service should be given where needed.

On motion the report was then received by the association, and the meeting adjourned.

Tuesday's Session

The session of the Transportation & Traffic Association on Tuesday afternoon was a joint meeting with the Claims Association and was devoted to traffic regulation and safety work. The first report presented was that of the committee on traffic regulation. This follows in abstract below:

TRAFFIC REGULATIONS

The report contains the code of traffic principles drafted in conference at Washington, Jan. 10-11, 1921, at which practically all associations of national scope interested in traffic were represented. W. H. Maltbie of the committee represented the committee in this work. Another result of the conference was the preparation and consideration, although without final approval, of a modified uniform traffic code.

The code of traffic principles covers not only the methods of administration to be followed but recommends the registration of all vehicles and the licensing of their drivers. Among other things it provides that operators must be at least sixteen years of age to obtain a license and that chauffeurs be eighteen years of age. Speed limits of motor vehicles should depend on the weight and tire equipment of the vehicle, whether pneumatic, solid or metal, and for passenger motor vehicles such speed limit should not be less than 30 m.p.h. in open country, 20 m.p.h. in residential districts and 15 m.p.h. in business districts. Motor trucks and motor buses must carry a metal plate showing the actual weight of the vehicle with its equipment and the loading or seating capacity.

Reciprocity as between states is recommended toward vehicle and operators' licenses for a three-month period in any one year, the time not necessarily being consecutive. Size and weight restrictions by the proper authorities should contemplate the protection, safety and convenience of the traveling public, the preservation of the highways and the meeting of highway requirements. Lighting requirements recommended are those issued by the Illuminating Engineering Society under date of June, 1920. This code of traffic principles is signed as being approved by twenty-one interested associations.

The Washington conference urged the classification of grade crossings as "ordinary" or "dangerous" and declared that in the latter, in addition to being protected by standard grade crossing signs, be marked with uniform and conspicuous signs specifying the speed at which vehicles may cross. The committee requested that the United States Bureau of Standards make a study of such signs, including size, location, etc., and that it should have the advice and co-operation of the signal section of the engineering division of the American Railway Association as well as that of the signalmen of our Engineering Association.

Many favorable comments, the report states, have been made upon the committee's original code of traffic principles and model traffic ordinance. The ordinance, with some slight modifications, has already been adopted by the Canadian Electric Railway Association. The report is signed by H. B. Flowers, chairman; F. R. Cogswell, A. Gaboury, R. F. Kelker. Jr., W. H. Maltbie, H. B. Potter, Fielder Sanders and Paul E. Wilson.

Following this report were papers on traffic regulation by Inspector John O'Brian of the New York City Police Department and J. M. Quigley, Chief of Police Rochester, N. Y. Abstracts of these papers are published elsewhere in this issue.

The report of the committee on safety work was then presented by E. C. Spring. An abstract of this report follows:

SAFETY WORK

A study of public accidents indicates that of the total deaths caused thereby last year 78 per cent, or 60,000, occurred on the highways or in the home. Industrial accidents declined as a result of the concentration of effort put upon them by industrial management. The committee believes that the same amount of vigilance backed by education will accomplish much in the elimination of public accidents.

The teaching of safety must not be made a spasmodic or perfunctory matter and if done it will not accomplish the result sought. Electric railway accidents cover a wider range than other industries largely because their track locations bring them into more intimate contact with both vehicular and pedestrian traffic. Here is a situation that demands close vigilance not only on the part of the operating departments but constant study by all the company officials to improve conditions.

Information collected from 131 companies dealing with accidents and safety work indicates that there is an urgent need for active participation in accident prevention. Of a total of 86,500 accidents reported 50.5 per cent come within classes directly affected by the public safety movement. Fifty per cent of the companies reporting are spending nothing on safety work and the balance only average $2,002 per company per annum. Eighty-six companies do not have departmental safety committees, yet of the thirty-nine who have them, thirty-six report they are successful.

STATISTICAL STUDY OF SAFETY WORK BY ELECTRIC RAILWAYS

Number of Companies Reporting	Yes	No	No Reply
Has company entered into any public safety campaign?........	42	80	9
Has company given co-operation to any local safety movement?..	49	55	27
Is company member of National Safety Council?...............	67	54	10
Has company done any work in connection with public schools and to what extent?...........	50	69	12
Has company carried safety advertising in its cars?............	78	49	4
Has company co-operated in safety work with automobile associations?......................	31	84	16
Has company adopted as a basis the standard code of operating rules of the T. & T. Association?	75	44	12

Electric railway hazards, the report states, may be divided into two main groups, namely, industrial or applying to employees only, and operating or those involving the public. In the first group the hazards are those similar to those of other industries and should be handled along similar lines. The second group divides into three subdivisions, namely, urban, suburban and interurban operation. Each of these three subdivisions is further divided into five more classes, namely, boarding and leaving cars, collisions with cars, collisions with vehicular traffic, accidents to pedestrians and passengers injured on cars. Of these last five classifications, the third and fourth involve most frequently the public safety. Probably in the greater number of cases the driver or pedestrian is at fault for the resulting accident, but that fact does not lessen the need or wisdom of the traction company supporting the public movement. Street railway companies should actively foster the public safety movement in their respective communities, and the place to start is in the home and school, with particular reference to safety on the streets.

The report then goes on to detail how this can be accomplished and illustrations are given of the campaign plans followed in some places. An appendix outlines a suggestion for safety work in cities too small to support a paid local secretary.

The report recommends that the joint safety committee of the T. & T. and Claims Association be made a permanent committee for and under the direction of the American Electric Railway Association, such sommittee to act in an advisory capacity on matters of safety for that association.

The report is signed by E. C. Spring, chairman; R. E. McDougall, co-chairman, and W. H. Boyce, G. E. Deibert, H. V. Drown, C. G. Rice, C. B. Scott and E. M. Walker.

In discussing this report C. G. Rice, Pittsburgh, stated that there was no reason why transportation and claim men could not work congenially. If the transportation men could cut down the number of accidents, they were entitled to all the credit. The real trouble was that while the transportation men believed in safety, they did not always like to do all that it required. Accidents should be anticipated, and it is just as well to be a little timid at times. He then declared that the report calls attention to the automobile hazard—a live subject. There are 9,000,000 automobiles in the country and they are increasing at the rate of about 2,000,000 per year; in other words, there is one auto for every fourteen of population. In Pennsylvania the 600,000 automobiles, or one for every thirteen of population, killed 1,141 persons in the past three years, with but three convictions. In the first six months of this year they killed 103 people. In Allegheny County alone, where it is figured there are 120,000 machines, the accident ratio has not increased, though it has not decreased. The streets are no longer safe playgrounds for the children, and it is hard for the parents to realize the change. It is not impossible, however, of correction if the idea of safety is sold with the car. The automobile manufacturers and dealers when selling cars should instill into the minds of the purchasers the idea of safety in operation. The standardization of traffic laws will have much to do with the elimination of some accidents. Under present conditions there is not much uniformity, although good work is being done by the Traffic Officers' Association in trying to have a standard code adopted.

Another means of accident control, according to Mr. Rice, is the licensing of operators and having the operators actually demonstrate their ability to handle properly the cars they drive. Strict enforcement of these traffic rules will also do much toward improving public safety. New York City and the State of Massachusetts have done much along this line. In Massachusetts during the past year 1,200 licenses have been suspended and 900 revoked, while in Pennsylvania, where the enforcement is rather lax, there have been only eighty-nine revocations. The formation of local vigilance committees to report violators is not impossible or wrong. The state of mind in most cities requires that something be done to curb the continued reckless operation of motor vehicles.

In the Pittsburgh district what is known as the Safe Drivers' Club is supported by employers, such as coal concerns, taxicab companies, etc., who use a large number of automobiles. A series of meetings is held for the chauffeurs and subjects of interest to safety are discussed. When these employees know that their employers are back of the club they take more of an interest in its aims. It is planned to close the series of meetings with a public meeting and to urge a central traffic court where all violators of traffic regulations would be treated alike. There is much that can be accomplished in the interest of public safety, but it cannot all be done at once.

Speaking of safety organizations, Mr. Rice pointed out that since the formation of safety committees in the industrial plants of western Pennsylvania the fatalities had decreased from 50 per cent of all accidents to 30 per cent and that a man was now safer at work than at home or on the street. Safety is a development of the mind, a mental attitude, and it does not matter whether it is obtained in the mill, at church or on the street. Safety can be developed only if worked from both ends, so to speak, by teaching it to the child in the school and to the man when at work. The National Safety Council believes in the establishment of local safety councils in every community and experience shows that where established it pays, for it has proved of benefit in many cities.

The traction companies, however, for some reason or other are backward in taking an active part in public accident prevention. Nevertheless, there is every reason to believe that a year's effective organization work along these lines will reflect a decrease in the number of accidents and causes of railway accidents.

Britton I. Budd, Chicago, also discussed the report of the committee. His prepared discussion is given elsewhere in this issue. In addition he spoke of the large number of companies that were doing nothing to develop public safety and stated it was useless to attempt such work in a community unless the traction company helped out in some manner. The money spent for safety work on each of the properties with which he is connected has brought more benefits than any similar expenditure. The effect on the morale of the employees cannot be figured in dollars and cents, for it develops an interest in the company not otherwise gained. It is essential though that the suggestions made by employees be acted upon promptly and, if approved, that the work orders issued should have precedence over other work orders.

It was his belief that it was essential for railways to back up safety organization work and also that it was up to every railway to have a safety organization of its own.

Edward Dana, Boston, complimented the committee on its report and was surprised to learn that the railways were doing so little with regard to accident prevention. It is now time to put the house in order, but it is a problem. It becomes necessary, first of all, to have the co-operation of the whole personnel of the railway employees, which can be done through company training schools. But the contact with the public at large can more easily and perhaps only be reached through the National Safety Council, of which the Boston Elevated Railway is a member. In Boston the number of accidents so far in 1921 has decreased 1,000 over the average for the same period for three years previous. The cost of accidents is less than 2½ per cent of the gross revenue. The company has now its own industrial accident company, with the heads of departments as officers. This has materially reduced the premium which the company must necessarily pay under the Massachusetts laws for similar protection.

H. B. Flowers said that in Baltimore, in co-operation with the National Safety Council, the railway company organized a no-accident campaign week, along lines suggested by the safety council. During that week there were 309 accidents of all kinds, compared to an average of 415 for the four weeks preceeding, a decrease of 106 accidents, or 25 per cent. During the first week following there were 269 accidents, a decrease of 119, or 28 per cent, and for the second week after 295 accidents, or a decrease of 29 per cent. If a comparison is made with the average for the whole nine weeks since the campaign, which is 277, there is found a decrease of 138 accidents, or 33.2 per cent. The effect of the campaign is felt in more ways than one, for the public press and the public at large knew the railway company was behind the campaign.

H. A. Mullett, Milwaukee, told of some of the work undertaken in that city. The Association of Commerce has taken an active part in industrial campaigns for the prevention of accidents. There are two divisions—one composed of manufacturing companies for the prevention of industrial accidents and the other of individuals for the prevention of street accidents. The funds for the industrial accident campaign come from the manufacturers while in the case of street accidents the funds were raised by popular subscriptions to what is called a safe drivers' club. The first year $6,500 was raised—from memberships at $1 each. This year a similar amount was raised, but it was harder, for the idea had to be sold to each subscriber, whereas before it was new and the work was undertaken during a campaign. In addition there is the vigilance committee of 100, on which some motormen are members. They do very effective work, and often from fifteen to twenty-five reports of violations of traffic regulations are turned in. The Milwaukee company has also for the last five years maintained a chief safety inspector and also has local safety committees in the shops and carhouses. The latest innovation is to show photos of wrecked cars and accident statistics graphically comparing each station or carhouse on an equal footing.

A. J. VanBrunt, Public Service Railway, told of the safety patrols or junior policemen which he had formed in the schools. The members of this patrol wear a distinguishing arm band and are trained by a uniformed policeman. They act at crossings in the absence of regular traffic officers and at school recess protect the smaller children.

Wednesday's Session

This was a joint meeting with the Accountants' Association to consider two reports. The first was that of the committee on economics of schedules and was read by Edward Dana, chairman. An abstract follows.

ECONOMICS OF SCHEDULES

The committee was asked: (1) To develop definitions and analyses of car-hours and crew-hours, (2) to study the question of variable running time, and, (3) to report on recent methods for speeding up traffic in congested centers, as done in Boston, Washington and Kansas City by John A. Beeler, as well as at other points. The committee first recommends the following definitions, the first group referring to car-hours and the second to man-hours:

1. *Running Time* is scheduled time operating between terminals, including time allowed at stops.
2. *Layover Time* is time allowed on schedule for layover of car at terminals.
3. *Run-off Time* is scheduled time to and from carhouses and connecting point of line.
4. *Excess Time* is time of car operating in excess of schedule due to service delays.

1. *Platform Time* is actual time of operating trips, including time between trips allowed on schedule as layover time.
2. *Report Time* is time allowed for preparing car for service or putting car away after service.
3. *Run Allowance Time* is time in addition to platform time allowed to bring run up to prescribed number of hours.
4. *Spread Allowance Time* is time allowed because of length of spread over all time to work a given run.
5. *Guaranteed Minimum Time* is the amount of time allowed to bring the time of extra men up to the prescribed number of hours per day or week.
6. *Overtime* is time worked by men in excess of their regular scheduled run or assignment for day's work.
7. *Continuous Time* is time allowed between completion of regular run and time reporting for extra work. This also covers all swings for which crews are paid.
8. *Instruction Time* is time allowed platform instructors in excess of regular running time, as well as time allowed to students.

Until these definitions have been approved the committee doubts the advisability of formulating any definite method for recording of these data.

On variable running time the committee points out that on the average road there are six different running times, as follows: (1) Inward bound a.m. rush hour, (2) Outward bound a.m. rush hour, (3) Inward and outward bound throughout the base schedule period, (4) Inward bound during p.m. rush hour, (5) Outward bound during p.m. rush hour, (6) Inward and outward bound during the evening and early morning hours. As speed is an essential factor in determining cost of service, the committee recommends care to prevent waste in running times by using the six running speeds in schedule making.

In discussing the handling of traffic in congested centers the report points out that as street cars are confined to a fixed path and as they carry many times the number of passengers per unit that other vehicles do, it does not seem unreasonable to ask support from the public authorities to reduce delays to a minimum. Agitation along these lines also has the indirect benefit of attracting public attention to the fact that many delays of street cars are due to causes for which the operating company is not responsible.

The following methods are recommended to facilitate loading and unloading in crowded districts:

Loading platforms, which may be placed at heavy loading and unloading points where the street width permits. They should be 4 to 6 ft. wide, from 8 to 10 in. high and from 50 to 100 ft. long. In some situations it has been found necessary to maintain lights on the platforms after dark as a warning to vehicular drivers, but this is not done where there are street lights nearby. The lights should be maintained by the city. They are used successfully in San Francisco, Boston, Pittsburgh, Washington, D. C.; Minneapolis, Kansas City, Baltimore, Newark, Los Angeles and Indianapolis.

Safety zones, marked by upright stanchions, are helpful in reducing accidents and can be used on streets where there is a distance between curb and nearest rail of not less than 15 ft. They are most effective if placed under the control of police department and the city should be responsible for the maintenance of lights on stanchions. White lines on pavement also are useful as a guide to traffic and protection to waiting persons. If the street is wide enough to permit safety zones, the consent of authorities to loading platforms should be asked. Good results reported from Los Angeles, Seattle, Louisville, Milwaukee, Columbus, Portland, Ore.; Baltimore, Brooklyn, San Francisco, Pittsburgh, Detroit, Washington, D. C.; Cleveland, Minneapolis, St. Louis, Philadelphia, Kansas City and Indianapolis.

Queue loading has been found effective in facilitating the loading of cars, but has not been so successful on streets where there is more than one line of cars. Queue loading gives best results when used in connection with multiple-berthing of cars and assisted by front-end collectors. Indorsement of this system is given by the companies in Detroit, Milwaukee, Pittsburgh, Dallas, Portland, Ore.; Philadelphia and Seattle.

Double or multiple berthing is used where cars on close headway stop before crossing an intersection and all proceed on the same signal. The system saves unnecessary steps, speeds up service and reduces congestion. In Pittsburgh and Kansas City berthing spaces are marked by signs suspended from the trolley wires at the exact place where passengers are to board. Used with satisfaction in Seattle, San Francisco, Milwaukee, Boston, Pittsburgh, Washington, D. C.; Minneapolis, Kansas City, Baltimore, Philadelphia, Los Angeles and Indianapolis.

Street collectors or additional men stationed at congested points and terminals to collect fares and so increase the rate of loading, are especially helpful if used with loading platforms or queue loading. One company reports having loaded passengers at a rate twice as fast as where all fares are paid to conductor. Others report a quicker and more even loading of cars with this system. It is especially helpful at stub-terminals in the congested district. One company keeps down the expense for this extra service by using as collectors in rush hours men who work inside other departments during the day. Used successfully in San Francisco, Los Angeles, Seattle, Milwaukee, Boston, Washington, D. C.; Dallas, Kansas City, Chicago and Portland, Ore.

Prepayment areas are used to good advantage in Boston, where the company has purchased property at several points where rapid transit and surface cars have a common terminal. Persons entering this area pay their fares at a booth and are then ready to board cars without delay. These areas cannot be installed, to any great extent, on public property in traffic centers.

Traffic Regulations: Street cars can serve the community best when given a clear right of way. This can be assisted by prohibiting parking of vehicles along car routes in congested districts at least during the rush hours, limiting the parking to thirty minutes during other hours, forbidding coal deliveries along car lines during the day and restricting parades to certain streets. The day may come when other vehicles will not use car tracks in any part of the city, and thus a better schedule speed can be maintained throughout the system. Traffic ordinances will not clear the tracks unless enforced by police and courts. A further improvement can be secured by adopting a rail head which does not provide a guide for vehicle wheels. Beneficial results with police co-operation have been secured in Chicago, Milwaukee, Boston, Portland, Ore.; Baltimore, Brooklyn, Los Angeles, Seattle, Pittsburgh, Cleveland, Kansas City, Washington, D. C., and Columbus.

Other topics considered were: elimination of loops in congested districts, turnbacks outside of congested districts, elimination of left-hand turns, one-way streets, segregation of vehicle traffic, semaphore control of traffic, location of passenger stops, reduced number of positive stops, staggered hours, trailer cars and jitney control.

The report is signed by Edward Dana, chairman; J. M. Campbell, Donald Goodrich, E. H. Ives, B. F. Jacobs, H. C. Moser, A. G. Neal, Harold A. Otis, Samuel Riddle, Walter Schroyer and J. A. Stoll.

There were two prepared discussions, one by John A. Beeler, New York, and the other by Albert S. Richey, Worcester.

In discussing the report of the committee John A. Beeler, New York, said: The definitions of schedule terms have been needed for many years, as it is difficult to compare companies reporting scheduled hours in different terms. The careful research made by the committee of handling traffic in congested centers indicates that the specified means for relieving congestion are giving good results where they are properly applied, and the recommendation that these various methods be applied elsewhere to facilitate street car operation and eliminate congestion is a sound one.

While the subject of traffic regulations is stated by the committee to be somewhat outside the scope of its investigation, it is pointed out that such things as prohibition of parking, elimination of left-hand turns, use of one-way streets, segregation of vehicle traffic, semaphore control of traffic, etc., have a marked bearing on schedules. in fact, everything that clears the way for the passage of a street car must assist in keeping not only the cars but all traffic moving. Enterprising city governments are now realizing this and are in many instances inaugurating such regulations. In other cities quasi-public bodies like chambers of commerce are working along similar lines.

In inaugurating the innovations mentioned in the report the railway operator is sure to meet with a discussion regarding the effect on safety. He should emphasize that speeding up traffic movement is not done by running the cars at a breakneck pace, but by eliminating time that traffic is standing motionless. Streets relieved of congestion have proved themselves much safer than those clogged with jammed, slow-moving traffic.

The installation of loading platforms may in itself appear a matter of little consequence, but they can be used to advantage to concentrate the riders right where they will board the cars, and at the same time they provide a safe waiting place out of the street traffic. Platforms also facilitate loading by decreasing the physical effort to board the car. Their use presents advantages to the car riders even greater than those cited for a bus loading at the curb. Not only do loading platforms speed up street car movements but they assist in the movement of traffic generally.

Double berthing, or cutting out the waste time at stopping places, speeds up schedules and tends to greater regularity of service. The second berth may be used very little save in emergencies, for with greater regularity of car movements the number of times that a car is delayed by the one immediately ahead is reduced. This result, of course, is not obtained if the mistake is made of stopping the car at both berths.

Elimination of left-hand turns has transformed some of the most complicated and difficult traffic corners in the United States to quiet and orderly intersections, although there may be more traffic moving straight ahead than formerly. The exact location of car stops at junction points is of great importance, as they should be placed not only to prevent street car interference but to reduce interference with general traffic as well.

The use of street collectors is a courtesy extended by the company to the public that results in faster and more even loading of cars. It conserves the time of the public while saving money for the company.

Routing is a subject of tremendous importance. A change in downtown routing may enlarge the delivery district and at the same time reduce the number of cars at congested points. This is of great advantage to both public and the company. These methods all eliminate waste motion and lost time for the passengers, which incidentally saves time for the company and results in faster schedules. Relatively unimportant as any one of them may appear individually, many a company has been saved from bankruptcy by an increase in speed of less than a mile an hour.

A note of caution is not out of place against indiscriminate application of these remedies for improving traffic conditions without a thorough analysis of the causes of the existing congestion. After a correct diagnosis of the case a forecast should be made of the results of applying each of the remedies enumerated. It is my experience that certain and frequently all of these means are applicable for the betterment of the general traffic situation in any community where the changes are properly inaugurated and the right kind of publicity obtained.

The phases of street railway operation covered by this report offer greater opportunities for reducing operating expenses that any others I know. In one large city that conducted a campaign of this nature the result was not only to popularize the service but to increase the net income a million dollars a year. Capitalized at 10 per cent, this is equivalent to adding $10,000,000 to the value of the property.

A. S. Richey, Worcester, Mass., the next speaker, congratulated the committee on its report and called attention to the fact that the committee had well defined the four constituent parts of car-hours, namely, running time, layover time, runoff time and excess time, but had not given an exact definition of the term "car-hours." He mentioned the difficulty which is experienced in comparing the schedule speed of two roads unless the method of reporting car-hours is definitely known. He suggested that in addition to the four definitions relating to car-hours recommended by the committee the association adopt a fifth defining car-hours as the total time embraced in the four as stated.

Following these two statements the discussion of the report was opened to the floor of the convention. Alexander Jackson, Public Service Railway, stated he believed the four definitions relative to car-hours as well as those for platform time and report time conflicted with those submitted in 1914 by the then committee on definitions. He read the 1914 definitions to substantiate his position.

It was pointed out by W. B. Wheeler, Third Avenue Railway, New York, that the definition for running time, while using different words, meant the same as the 1914 definitions. It was not feasible, F. R. Cogswell, Pittsburgh Railways, stated, to separate runoff time when cars returned through a territory that offered good business. Chairman Dana pointed out that runoff time was to be used only when cars were not engaged in revenue service. In the case outlined by Mr. Cogswell such time would be a part of the running time.

On motion by J. V. Sullivan, Chicago, it was voted that hereafter when asking for car-hour figures for comparative purposes they be figured so as to include the four parts suggested by the committee in its definitions. The four definitions as to the division of car-hours and the eight applying to man-hours were approved.

In discussing variable running time F. R. Cogswell, Pittsburgh, stated that on his property if a man works a run that is made up of two pieces, each on a separate car, the time intervening between the two pieces must be paid for. He also stated that due to the narrow Pittsburgh streets the loading platforms necessarily had to be narrow and that as a result queue loading automatically resulted. If passengers do not follow this plan they cannot get on the cars.

On the Third Avenue Railroad W. B. Wheeler stated that the running time was varied according to the degree of congestion. This was especially true of the so-called owl car service. Due to the large amount of single track and division lines it was not possible to change the running time very frequently, and then, too, to do so put a burden on the schedule makers. In Pittsburgh it was pointed out by F. R. Cogswell that the running times were changed five times daily, that is for the morning peak, mid-day, evening rush hour, evening and for owl service. In summer on the heavy traffic lines there is perhaps more layover time in the rush-hour schedule than during the winter. On the light traffic lines nothing but a uniform schedule is maintained.

In Baltimore, according to J. H. Stoll, variable running time has been applied to many lines. On the heavy traffic lines there are five or six changes a day, while on the crosstown and light traffic routes there are but two changes. These changes have effected a real saving in the number of cars and car-hours operated and have also materially speeded up the system. It has also had a good effect upon the car rider for it enables him to get to his destination quicker, and so far as car operation is concerned it takes up the slack during certain hours. Variable running time should also be carefully considered.

In Youngstown, Ohio, as pointed out by C. D. Smith, this method of schedule making is followed on both the urban and interurban routes. It has developed that if schedules were not changed the men would do it themselves so as to get more layover time. He believed it best to study schedule conditions as operated and make at least four changes in running time, thereby making a saving in cars operated.

C. E. Morgan, Brooklyn, agreed in the necessity of having variable running times. He told how the traffic on each line must be continually analyzed for the full twenty-four hours of the day and that if it were not done those who were in charge of operation were not serving the company in the way they should. It pays to add schedule makers and to change schedules even as frequently as sixty to ninety days. The only way to make any profit in the railway is to keep the wheels turning. Factors that enter into schedules are demand and units of operation, either single cars or trains, and as traffic thins out to take off or turn back cars at specific points. His studies had enabled him materially to better handle the traffic with a lesser number of cars. On single-track turnout lines it is possible to speed up by spreading out the meeting points. It is the net results that should be looked out for and not the mere fact that an expenditure has to be made to accomplish the desired result. The point to be looked out for is an increase in the number of passengers per seat-mile and to eliminate all unnecessary car-miles.

FREIGHT ACCOUNTING

The second report presented at the joint meeting was on freight accounting. The report stated in part:

This tentative classification and system of freight accounting for electric railroad corporations is made with the hope of filling a long felt need for a system which would give an accurate record of the results from the operation of freight business. It is so prescribed that any corporation, by keeping on its books the accounts prescribed by the Interstate Commerce Commission can carry out this system with very little additional labor and expense. In most cases the accounts of this classification, were different from those prescribed by the I. C. C., are merely groups of several accounts of the latter.

In order that uniformity in the application of the provisions of this system may be secured the accounting officers are requested to submit all questions of doubtful interpretation to the joint committee on freight promotion and costs, as appointed by the American Electric Railway Association, for its consideration and decision.

WAY AND STRUCTURES

Maintenance of Track, Overhead, Etc. (1-23). — This account shall include a proportion of the cost of maintenance, including supervision of roadway, track, bridges, signals, telephone lines, distribution system and all miscellaneous way and structures expenses as shown in the uniform system of accounts, numbered from 1 to 23 inclusive. This account shall be charged with the proportion that the freight car-miles bear to the total car-miles operated.

Buildings and Fixtures (24). — This account shall include the cost of labor and material used in repairing freight stations, platforms and all other freight structures; also a proportion of the cost of repairing jointly used carhouses, shops, offices and other buildings, same to be proportioned on use or car-mile basis.

Depreciation of Freight Buildings and Structures (25). — This account shall include the amount set aside to provide a reserve for the retirement of freight stations, platforms and other freight structures.

EQUIPMENT

Repairs to Freight Cars (31, 33).—This account shall include the cost of all labor and material used in repairing bodies, trucks and electrical equipment of freight cars.

Repairs to Service Equipment (32).—This account shall include a proportion of the cost of repairing service cars, including line cars, snow plows, sweepers, etc., same to be proportioned on the car-mile basis.

Repairs to Locomotives (34). — This account shall include the cost of labor and material used in repairing locomotives. This includes repairs to bodies and trucks and all fixtures and appliances inside and outside of bodies and trucks including electric motive equipment of locomotives.

Miscellaneous Shop Expenses (29, 36, 37, 39).—This account shall include a proportion of the cost of shop supervision, repair to shop equipment, cost of heating shops and other miscellaneous shop expenses, same to be proportioned on use or car-mile basis.

Depreciation of Freight Equipment (40). — This account shall include the amount set aside to provide a reserve for the retirement of freight equipment.

POWER

Power Delivered to Cars (45-62).—This account shall include the total cost of power, including generating, converting or the amount paid for power purchased and all expenses incident to delivery of power to cars. Where power is purchased give details including cost per kilowatt-hour. Where trail cars are hauled add 25 per cent additional for each car.

CONDUCTING TRANSPORTATION

Freight Trainmen (65). — This account shall include the wages of motormen, conductors and other trainmen engaged in freight service.

Station Employees and Expenses (68, 69).—This account shall include wages of agents, warehousemen and others employed in freight stations; also the cost of heating and lighting stations and other miscellaneous freight house expenses.

Freight Collection and Delivery (38, 76, 96).—This account shall include the wages of chauffeurs, drivers and helpers employed on wagons or other vehicles, used for collection or delivery of freight. This account shall also include the cost of repairing wagons, harness, trucks and all garage and stable expenses incidental to maintenance of wagon or truck delivery service in connection with the freight business.

Loss and Damage (77). — This account shall include the expenses incurred for losses and damages to freight intrusted to the carrier for transportation, also cost of settling such claims.

Miscellaneous Car Service Expenses (67). — This account shall include miscellaneous expenses for car and locomotives, such as lubricants, waste, carbons for headlights and other supplies except such as are used for repairs.

Carhouse Employees (70).—This account shall include the wages paid car, motor and brake inspectors and other carhouse employees not engaged in making repairs.

Miscellaneous Transportation Expenses (63, 66, 71, 72, 73, 78). — This account shall include a proportion of the cost of superintendence of transportation, operation of signals and telephone lines and other miscellaneous car service and transportation expenses, same to be charged on the car-mile basis.

TRAFFIC

Solicitation of Freight (79). — This account shall include the salaries and expenses of freight solicitors and clerks.

Advertising (80).—This account shall include the salaries and expenses of advertising agents, the cost of printing and distributing timetables, folders, notices to shippers and all other freight advertising matter; also freight advertising in newspapers and magazines.

Miscellaneous Traffic Expenses (82).—This account shall include miscellaneous traffic expenses of the freight department.

GENERAL AND MISCELLANEOUS

Officers, Clerks and Miscellaneous General Expenses (83-91, 95). — This account shall include a proportion of the salaries and expenses of general officers and clerks, law expenses, stores expenses and miscellaneous general office supplies and expenses, the charge to be made on the basis of gross earnings.

Accidents and Damages (92). — This account shall be charged with salaries and expenses of claim agents and attorneys and amounts paid in settling claims of accidents arising from the operation of freight cars.

Insurance (93). — This account shall include premiums paid for insurance on freight buildings and equipment, also premiums paid on freight in freight houses and in transit.

FREIGHT DEPARTMENT—REPORT OF EARNINGS, EXPENSES AND STATISTICS

SUMMARY OF OPERATIONS

Earnings
Month of This year to last year to
Freight (car load).
Freight (less car load).
Milk and cream.
Other revenue.
Gross Earnings—operating expenses.

Ways and structures:	Accounts	(Note)
Maintenance of track, overhead, etc.	1-23	(B)
Maintenance of buildings and structures	24	(A)
Depreciation of freight buildings	25	(A)
Equipment:		
Repairs to freight cars	31, 33	(A)
Repairs to service equipment	32	(B)
Repairs to locomotives	34	(A)
Miscellaneous shop expenses	29, 36, 37, 39	(B)
Depreciation freight equipment	40	(A)
Power:		
Power delivered to cars	45-62	(A)
Conducting transportation:		
Freight trainmen	65	(A)
Station employees and expenses	68, 69	(A)
Freight collection and delivery	38, 76, 96	(A)
Loss and damage	77	(A)
Miscellaneous car service expenses	67	(A)
Car house employees	70	(A)
Miscellaneous trans. expense	63, 66, 71, 72, 73, 78	(B)
Traffic:		
Solicitation of freight	79	(A)
Advertising	80	(A)
Miscellaneous traffic expenses	82	(A)

Month of This year to last year to

General and miscellaneous:	Accounts	(Note)
Officers, clerks and miscellaneous general expenses	83-91, 95	(C)
Accidents and damages	92	(A)
Insurance	93	(A)
Stationery and printing	94	(A)
Rent of tracks and facilities	97	(A)
Rent of equipment	98	(A)
Total operating expenses		
Taxes		(A & C)
Income less operating expenses and taxes		
Interest		
Net income		

Note—Proportioned—A=actual, B=car-mile basis, C=gross earnings basis.

FREIGHT STATISTICS

Passenger car-miles operated
Total freight motor car-miles operated
  Miles loaded cars
  Miles empty cars
Total freight trail car-miles operated
  Miles loaded cars
  Miles empty cars
Total milk car-miles operated
  Miles loaded motor cars
  Miles loaded trail cars
  Miles empty motor cars
  Miles empty trail cars
Total freight locomotive-miles operated
Total tons carload revenue freight handled
Total tons less carload revenue freight handled
Total tons non-revenue freight handled
Total train-miles operated
Average cars per train
Freight revenue per ton per mile
Tonnage handled and expense at principal freight terminal
Tonnage handled and expense at average station
Number of miles road operated
  Single track
  Double track

Stationery and Printing (94).—This account shall include the cost of printing freight bills, waybills, milk tickets and other freight printing; also the cost of stationery and postage used by the freight department.

Rent of Tracks and Facilities (97).—This account shall include the amounts paid for rent or use of tracks and facilities by the freight department.

Rent of Equipment (98).—This account shall include the payments to other companies for rent or use of freight cars and equipment.

TAXES

This account shall include gross earnings and income taxes based upon the gross and net earnings of the freight department; also a proportion of all other taxes, same to be proportioned on the gross earnings basis.

INTEREST

This account should be charged with the interest on equipment and facilities used exclusively for freight business, at the same ratio that the general mortgage or indebtedness bears to the total value of the railroad property covered by the mortgage. For example: If the total value of the railroad, as covered by the mortgage, amounts to $15,000,000 and the mortgage amounts to $5,000,000 at 5 per cent and the value of the equipment used exclusively for freight is $100,000; interest at 5 per cent per annum should be charged on one-third of $100,000, as in this case the railroad property is mortgaged for one-third of its book value. This account should also be charged with interest on any loans made for the purchase of freight buildings or equipment, not covered by the mortgage.

The above plan is suggested, but if any other basis is used give details. The distribution of operating expenses, taxes and interest will not be exactly the same on all roads but the fundamentals as set up in this system of accounts will give the cost of operation of the freight business from which we can obtain valuable information.

The report was signed by the two chairmen, F. W. Coen for the T. & T. Association and L. T. Hixson for the Accountants' Association.

DISCUSSION ON FREIGHT ACCOUNTING

In presenting the report of the joint committee on express and freight traffic promotion and costs, F. W. Coen, Cleveland, chairman, submitted a complete tentative system of freight accounting and a compilation of freight statistics from eleven Mid-West companies, which latter, however, he rather completely discredited for any valuable purpose because of many impossible figures submitted. He explained, for example, that the figures were not segregated as between motor and trail car-miles and that no division was made between carload and l.c.l. car-miles. He cited several other discrepancies from what must evidently be the true figure.

R. N. Graham, Youngstown, commented that the present I. C. C. accounting system provides but three freight accounts, one covering maintenance of freight cars, on the wages of motormen and conductors used on freight equipment and the third covering losses and damages resulting from freight claims. He pointed out the many ways in which this system is inadequate in determining the cost of freight service and expressed the opinion that the systems of accounting generally in use are exceedingly inadequate. For example, the segregation of maintenance cost of freight cars was no more important than the segregation of maintenance of electrical equipment used in freight service, or of the accidents involving freight equipment, etc. He maintained there was nothing to be gained by carrying freight at a loss and that the only way that it will be possible to determine whether this business is profitable or not is through the adoption of a complete system of accounting. As to the car-mile basis for the freight accounting system, he thought it was certainly not unfair to the freight business and probably favored it, because of the relatively higher maintenance costs involved in connection with operating freight equipment as compared to passenger equipment.

L. T. Hixson, Indianapolis, co-chairman of the joint committee, forwarded a letter which was read in his absence in which he maintained that the use of the ton-mile unit would be better than the car-mile basis recommended by the committee, and giving reasons for his contention.

G. T. Seely, Youngstown, pointed out that there were two important reasons for establishing a proper system of freight accounting. The first was for the purpose of determining the actual expense in order to find out whether a company is actually losing money in giving freight service, taking into consideration that the roadbed is already there. The second reason was for its value in determining whether the rates were proper, when taking into account not only the interest on the actual investment in freight equipment, but including also a proper proportion of the carrying charges on the investment in other equipment used.

F. D. Norviel, Anderson, Ind., pointed out that in 1911 a similar committee had made virtually these same recommendations as to accounting, but that the industry was just about as far along today as it was ten years ago in this matter. He said that the Union Traction Company of Indiana is using a system of accounting practically the same as was recommended by the association some years ago and that by this means it has been possible to arrive at a sufficiently accurate cost of freight service to make the statement that this business offered an opportunity for profit to electric railway companies.

Mr. Seely, in order to bring the matter to a head and avoid further delay in establishing a proper system of freight accounting, made the motion that the association adopt the classification of accounts as submitted by the committee and recommend that all companies put it into effect. He explained that even though this might not be the best system of accounting it would be better to put it into operation and try it out for one or two years, after which there would be a much better idea of its value or what changes should be made. The motion was passed after some discussion as to whether it was advisable to adopt this system in view of the difference of opinion expressed by the letter from Mr. Hixson on the use of the ton-mile or car-mile unit. Mr. Coen brought out that this matter had been thoroughly considered by the committee with Mr. Hixson in attendance.

C. E. Morgan, Brooklyn, moved that the association send out a notice to a high official of every member company urging that he take steps to have this system of accounting started on Jan. 1, 1922, in order to insure a comprehensive trial.

The meeting then adjourned.

Thursday's Session

At the closing session of the Transportation & Traffic Association convention, held on Thursday afternoon, the report of the committee on personnel and training of transportation employees was read by James P. Barnes, Louisville Railway, chairman. This, in abstract, was as follows:

PERSONNEL AND TRAINING OF TRANSPORTATION DEPARTMENT EMPLOYEES

The report covered specifically the matter of employment, and consideration of the proper training after employment was left for future committees. The committee's recommendations may be summarized thus:

1. All applicants for employment as trainmen should be received under uniform conditions and subjected to preliminary tests and, so far as possible, be interviewed in each instance by the same person. The preliminary stages of employment, which may be covered either verbally or by a written form, should be in the nature of elimination tests and should embody a general examination of the candidates for mental alertness, answering questions and his ability to execute simple instructions promptly and correctly. There should be a preliminary test of sight and hearing designed to eliminate candidates who are already "hard of hearing" "color blind," "short-sighted" or suffering from similar defects of sight or hearing. The preliminary test should be applied only as a basis of rejection and the test should be designed to eliminate the unfit.

2. Those who are found fit should be asked to fill out an application blank, each candidate in his own handwriting and preferably at the employment office under observation. The blank should include such additional questions as local conditions may require, but should cover certain minimum requirements specified in the report.

3. When vacancies are to be filled selection should be made from the appli-

cations on file, based on the information already obtained in the preliminary examination, application blank and references. The candidate chosen should be required to undergo a physical examination.

4. After the applicant has satisfactorily passed the preliminary and medical examinations, a general talk should be given by the employment agent, including presentation and preliminary instruction on operating and safety rules with the presentation of the student badge and instruction book.

5. The applicant should be personally introduced to the instructor or chief motorman or conductor who is to follow the detail of his "breaking in" on various lines, and this man in turn should personally introduce him to such of the instructing motormen or conductors as he is to operate with.

6. Following the "breaking in" on cars, there should be a brief and general instruction on a car or in the shop on mechanical and electrical principles of the equipment. This instruction should be brief and hit the high spots only, as it is felt that an attempt to crowd too much into this course merely bewilders the candidate and results in adding to, rather than decreasing, his troubles.

7. A written examination (questions to be changed at intervals) should be given at the end of the "breaking in" period on operating rules and such other matters as need to be covered, to be followed by a final talk from the head of the department on observation of rules, personal conduct, safety matters, accident prevention, etc., which talk will include some form of cross-examination on rules.

8. The new employee should be taken by the superintendent or assistant superintendent, where this is practicable, to the carhouse where he is to work and there personally introduced to the carhouse foreman, under whose authority he is to be placed.

9. At the end of the probationary period, the new employee should be brought in for oral examination as to rules, operating conditions, etc, and further instruction on personal bearing, accident prevention and similar matters.

10. The old men should be re-examined physically and on rules at intervals of not more than five years.

The report was signed by James P. Barnes, chairman; F. G Buffe, F. D. Burpee, F. L. Butler, Dr. John Leeming, A. P. Norris, Martin Schreiber, F. J. Trazzare and J. E. Wayne.

REPORT ON EMPLOYEE SELECTION AND TRAINING DISCUSSED

In discussing the report of the committee on personnel and training of transportation employees Dr. John Leeming, medical counsel Chicago Surface Lines, explained in detail some of the considerations involved in the report. He said that an intelligent employment man should easily be able to discover at the first meeting if an applicant is mentally dull, hard of hearing, color blind, short-sighted, deformed, etc.; in other words, plainly unfit for the service. A physical examination by a competent medical man is of great importance and essential before employment. A mental examination in the form of intelligence tests is also desirable. This will satisfy the medical examiner that the proposed employee is possessed of a fair degree of intelligence and mental ability.

Dr. Leeming said that while valuable mechanical devices have been contrived with the object of enabling the examiners to ascertain the mental ability of the applicant for quick appreciation and ready response to unusual situations suddenly presented, the information in regard to the intelligence status of an applicant may be obtained in a satisfactory manner by a competent examiner, who is fairly well posted on the principles of practical psychology, without the aid of any mechanical device. Such an examiner need not necessarily be a physician. This work might properly be handled by a trained and expert employment man, working in co-operation with the medical examiner, superintendent of transportation and general manager. Tests should be used which will indicate the applicant's powers of memory, attention, perception, adaptation, judgment (of forms, weights, measurements, etc.) and his readiness, accuracy and speed in voluntary motor response to mental impressions.

In regard to the importance of thorough medical examination, Dr. Leeming said that while the committee made only a modest recommendation in the form of a minimum requirement, some of its members favored a much more thorough examination than the report indicates. He said that of late years he had had opportunity to observe the benefits derived from a thorough mental and physical examination which eliminated approximately 10 per cent of the men who had previously passed the preliminary interview by the employment man.

The committee's last recommendation, that "old" men be re-examined physically and on rules at intervals of not more than five years was treated by Dr. Leeming in detail. The most complicated piece of mechanism, he said, that is used in running a street car is the human machine, and he, like other machines, will get out of order. Comparing the human mcahine to a bridge, he pointed out that it would not be safe to say: "This has been a good faithful bridge and has carried our cars and our passengers safely over it for many years. I notice its timbers are showing signs of dry rot, but it seems to be doing the work all right, therefore I will not go to the trouble and expense of examining it. I will take a chance with it." Even if there is no visible evidence of dry rot or any other surface indications of defect it is the engineer's duty to have every detail carefully and repeatedly examined and elements of weakness removed. If an old employee is disqualified he cannot be used, but maybe his disqualification is not so complete but that he may be safely used in some work other than that of trainman. If so he should receive preference. But if on re-examination a motorman is found to have positively disqualifying defects, he should be removed and not be permitted to endanger the lives of passengers.

This re-examination, said Dr. Leeming in conclusion, might in many cases be valuable to the employee, in disclosing partial and only slightly disqualifying defects, which in many cases could be benefited by advice and suitable treatment. Then, again, a motorman with slight ailments might be changed to a less hazardous run on outlying crosstown lines, or, in some cases a motorman might be made a conductor.

To use a mechanical analogy, if a company has a car, a rail or a signal which can no longer be used under the legal requirements of the highest degree of care and safety, it must be either repaired or used in some part of the service where it is not an element of danger. This is equally true of a trainman. It would be no answer whatever to a failure in duty in this regard to say that an unsafe employee is continued in his work because of his past service, however long or excellent, or because of his financial circumstances, however bad.

Henry H. Norris, ELECTRIC RAILWAY JOURNAL, abstracted his paper bearing on this subject. It appears in abstract earlier in this issue. He was followed by Robert L. Wilson, works manager Westinghouse Electric & Manufacturing Company. Mr. Wilson said that the committee was to be congratulated on the sound and definite recommendation presented. Physical examination, he said, is of great importance. In his company the most difficulty is experienced in determining how far to go in the re-examination of old employees. There is often opposition encountered both from the employees and from outside organizations.

The substance of the report of the committee, said Mr. Wilson, may be divided under the following subheads: (1) central employment department, or uniform methods; (2) application forms; (3) selection and physical examination; (4) preliminary instruction and explanation; (5) introduction of new employees; (6) detail instruction or breaking in; (7) examination.

Under the first head it may be said that success will depend not so much upon an specific method as upon the personality of those carrying on the work.

In the Westinghouse works the central employment department has been divided as follows: general division, men's division, women's industrial division, women's clerical division, statistical division, personal service division.

Under the second subhead, the application form is important, and under the third it may be said that in an industrial organization personal records are not given much attention. Applicants should be put through a preliminary "weeding out" process. In the interview which follows the filling in of an application form the success or failure of the employment function occurs. The interviewer must remember that he is selecting an employee, not alone for his ability to perform some manual work or for his intelligence, but he must consider what kind of a "front" the applicant can put up.

In this connection, said Mr. Wilson, the so-called psychological and intelligence tests should be used only by those of large experience. Each applicant accepted by the interviewer should be given a thorough physical examination, both as a safeguard to his prospective fellow employees and to insure his not being put on work unsuited to his strength.

Under the remaining subheads Mr. Wilson said that the employing officer should make the new employee feel that the railway is a desirable concern to work for. Any time taken in introducing him to his work and his fellows will be well repaid.

By way of summary, Mr. Wilson said that a well-organized personnel or employment department is about as valuable as any other one department to any large enterprise. In one thing, it should lessen labor turnover by substituting well-thought-out policies for haphazard selection and practices. It first sells the company to the employees and they, in turn, do a great deal in fostering a public opinion favorable to the enterprise. To deal fairly with employees it is necessary to know something about them as individuals; their skill, dependability, personality, length of service, etc. Hence, well-balanced records are kept by the employment department. It is necessary that petty injustices be corrected, and the employment department furnishes a good place to which a man can bring a real or fancied grievance for adjustment without fear of prejudicing his standing.

L. H. PALMER ELECTED PRESIDENT

At the close of the session the report of the nominating committee was presented by W. H. Sawyer, East St. Louis, Ill., and the report was accepted, thus electing the following: President, L. H. Palmer, assistant to the president United Railways & Electric Company, Baltimore, Md.; first vice-president, G. T. Seely, Youngstown, Ohio; second vice-president, J. K. Punderford, New Haven Conn.; third vice-president, Arthur Gaboury, Montreal, Que.; executive committee, G. H. Clifford, Fort Worth, Tex.; T. C. Cherry, Syracuse, N. Y.; J. V. Sullivan, Chicago, Ill.; Edward Dana, Boston, Mass.

W. H. Boyce, New Brighton, Pa., then presented the report of the committee on resolutions, which was accepted. In addition to expressions of appreciation for the several factors which had made the convention a success, a resolution of regret for the death of President J. J. Landers of the Accountants' Association was included. Mention was also made of the services of the technical press to the association. The report of the committee on personnel and training of transportation employees, with its ten recommendations, was then accepted; the president and first vice-president elect were introduced, and the meeting was adjourned.

Care in Construction and Maintenance of Overhead Lines*

Every Employee Should Take an Active Part in Establishing and Maintaining Safe Working Conditions—Much of the Danger on High-Tension Lines Due to Man-Failure

By A. B. Gates

Superintendent of Overhead Lines Commonwealth Edison Company, Boston, Mass.

IN THE early days of electrical distribution poles were erected and wires attached to these poles, with no thought as to the safety of the lineman who later must handle these wires while they were alive. As the distribution systems grew and more circuits were needed wires were added until the poles were so congested that linemen in ascending or descending were forced to climb out around the ends of the arms.

But changing times have changed conditions and we find that overhead line structures are now designed with considerable thought for the safety of the workmen, safe working methods are being established and every effort is being made to insure a proper attitude on the part of the linemen toward safety work.

In the design of overhead lines or structures the first consideration should be the strength of the structure. It must have a sufficient factor of safety to withstand any stress to which it may reasonably be expected to be subjected, and, secondly, it must be simple and so arranged that the conductors and equipment may be supported in a manner such that the workmen can ascend or descend the pole or structure without danger of accidentally coming in contact with the live conductors or equipment.

All conducting material, such as braces, transformer cases, bolts and guys not permanently and intentionally grounded, must be installed so as not to be in contact with grounded or live wires. The climbing space must always be kept clear of guy wires, live or grounded wires, as well as cable lateral pipes, transformer cases or other equipment.

KEEP TOOLS IN GOOD CONDITION

The most essential contribution to safe working methods in line work is satisfactory tools and equipment. Ropes must be free from metal strands and when worn they must be replaced. Cutting tools must be sharp and provided with suitable handles or holders, chisels, bars, wedges, hammers and star drills must be faced and free from mushroomed heads. Wrenches must be carefully inspected and repaired or junked when the jaws become worn or sprung. Every workman who is required to work on or near live wires should be provided with rubber gloves and every crew should be provided with a sufficient number of insulating covers so that all live or grounded wires or conducting material with which the workmen can possibly come in contact while working on or near live primaries can be covered.

As far as possible methods of doing standard work should be systematized and working rules should be established so as to insure uniform practice in all gangs. In addition to the working rules or standards a complete set of safety rules should be established, kept up to date and enforced. All conductors not known to be dead should be considered alive and when men are working on or near live wires all other conducting material with which the workmen may come in contact should be covered. No workman should be allowed to handle live conductors with rubber gloves only as protection on circuits of over 4,000 volts. If overhead line repair or construction work is to be done on live lines of over 4,000 volts high-tension tools of proper and safe design should be used.

Whenever a high-voltage line is killed to be worked on it should be grounded before it is turned over to the line crew, and in addition the line crew should put a ground on the line by means of a chain attached to the ground wire, if there is one on the structure, or to a pipe or rod ground, if no ground wire is available, between the point at which work is to be done and all sources of feed or back feed to that portion of the line. The temporary ground should not be removed until all work at that location is completed.

Whenever possible all circuits and lines should be killed while they are being repaired. In many cases the saving in labor effected by doing the work on dead equipment will more than offset the trouble and expense of taking the equipment out of service, and when the reduction of hazard is considered usually the decision can readily be made in favor of dead work. On our system the customers who are supplied from higher voltage lines—that is, 9,000 volts and above—are practically all provided with more than one source of supply so that we have not found it necessary to use high-tension tools for making line repairs, as usually we have no difficulty in taking a line out of service.

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*Abstract of an address delivered before the Public Utilities Section, National Safety Council, at the tenth annual Safety Congress, Boston, Mass., Sept. 28.

For distribution work we have found that a rubber blanket about 3 ft. square provided with three eyelets along two of its edges and 3 and 4 ft. lengths of ¾-in. garden hose provide the best protection possible while doing live work. Rubber gloves which have been tested for puncture at 5,000 volts are supplied to all workmen who have occasion to work on or near primary wires. These rubber gloves are always worn under a horsehide glove which has a complete palm, thumb and fingers, but has the back removed. The horse-hide glove is short, coming only to the wrist, and is held in place by a wrist strap. For work in rainy or stormy weather all men who do emergency work are provided with rubber coats and three-quarter length or sporting boots.

Our workmen are required to test their gloves by the air pressure method each time before putting them on. The foreman examines all rubber goods, other protective devices and tools at least once each week and in addition a monthly inspection is made by the safety inspector. With all precautions taken, through man failure or other causes, accidents may happen. In order to be sure that we will be prepared to meet such an emergency if it occurs, every member of the overhead line force is required to practice the prone method of resuscitation each week.

ATTITUDE OF THE WORKMAN TOWARD SAFE METHODS

Statistics show that 80 per cent of industrial accidents are caused by man failure; therefore, with the best and safest standards of construction followed rigidly, with the best of tools, equipment and safety equipment provided, and with the best possible working and safety rules drawn up and circulated among the workmen, little can be accomplished unless we can obtain the proper co-operation on the part of the men who are to do the work. The first step in attaining proper attitude toward safety and other established rules is a permanent working force. A premium should be placed on length of service. This can be in one of many forms, rate of pay, disability and death benefits, pension systems or in many privileges which can be made to depend on this factor. But even with all these inducements for continuous service, there will always be a turnover, and the men who leave must be replaced. The line force should be built up from the bottom and as far as possible all vacancies should be filled by promotion and new men hired in the lower grades.

Every groundman should be given a chance to learn. He should be taught the working and safety rules and should be examined as he progresses in the work. No workman should be allowed to climb and do line work until he has proved by examination that he is capable of doing the work of the grade to which he is to be promoted. After he has climbed for some time and is capable of handling himself on the pole and has become familiar with safety and working rules, he should be examined before he is allowed to work on live wires, and after he has worked on live wires under the direction of a lineman or a foreman, he should again be examined before he is promoted to the grade of lineman and is allowed to work on primaries without direct supervision by an experienced lineman or foreman.

If this method is followed no new man will be expected or allowed to do work for which he is not properly trained. Only when it is absolutely necessary should men be hired as linemen, and when so hired they should not be allowed to work without supervision until it has been determined that they are thoroughly familiar with the system and with the methods of doing work.

It should be impressed on every employee, and especially the new employee, that while engaged in his regular duties, which in line work usually require co-operation of the several men who make up the crew or gang, he is his brother's keeper and he must not only care for his personal safety but must so conduct himself in the execution of his particular part of the work that he will not endanger the safety of his fellow workmen.

We have heard many times that the foreman is the key to the safety situation. This is true and we should constantly preach and talk this idea. But let us remember that the real key to the situation in our safety problem is a proper attitude toward safety on the part of every employee who must engage in a line of work which without care is hazardous.

We must perfect our standards of construction from the standpoint of safety. We must provide the workmen with safe tools and equipment, and finally we must convince each member of the line force that he must believe in and practice safe methods before we can allow ourselves to believe that we are exercising care in the construction and maintenance of our overhead lines.

Gear Manufacturers' Association

THE semi-annual fall meeting of the American Gear Manufacturers Association will be held in the Powers Hotel, Rochester, N. Y., on Oct. 13, 14 and 15.

Reports will be offered by the various committees on standardization, and the papers include the following: "Gear Tooth Wear," by S. O. White, Warner Gear Company; "Duraluminum as a Material for Worm and Other Gearing," by R. W. Daniels, Bausch Machine Tool Company; "The Grinding of Gear Teeth," by J. F. Barr, The Gear Grinding Machine Company; "Tooth Forms," by E. W. Miller, Fellows Gear Shaper Company; and "First-Hand Impressions of Europe," by E. S. Sawtelle, Tool Steel Gear & Pinion Company, who has recently returned from an extensive trip through Europe studying conditions there. F. W. Sinram, of the Van Dorn & Dutton Company, Cleveland, is president of the association, and F. D. Hamlin, of the Earle Gear & Machine Company, of Philadelphia, is secretary.

Importance of Claim Department Statistics*

BY J. H. HANDLON
Claim Agent Market Street Railway,
San Francisco, Cal.

INTELLIGENTLY prepared claim department statistics, if readily accessible, can be used most advantageously by a claim agent not only for reference purposes but with the object of comparing present-day records of accidents and their costs with what has been accomplished in the past.

The natural tendency in gathering statistical information is to prepare this information in such detail that the main facts are obscured by the mass of accumulated data. On the other hand, there are claim agents who are content with such meager statistical information as the total number of accidents and the total costs of the same.

Claim department statistics should be so computed that they will promptly show any increase or decrease in any class or classes of accident on any division or line; at any carhouse or on any particular car or type of car; to any individual motorman or conductor, and they should readily reveal any increase or decrease in accident costs. By preparing such figures on a basis of car-miles, or car-hours operated, and passengers carried, many interesting facts are often brought to the surface.

Such a statement furnished at regular and brief intervals to the operating department for each division, carhouse or line has a tendency to create a rivalry between divisions, carhouses or lines, and the company reaps the benefit of that rivalry. It also enables the operating department to maintain a record of the amount each individual employee is costing the company for accidents. Incidental information as to the average number of witnesses obtained per accident and the number of "blind" or unreported accidents is also valuable to the operating department in co-operating with the claims department.

Additional statistics that are of direct benefit to the claim agent relate to the cost of operating the claim department; summarize the work of each of the investigators; give the percentage of accidents that result in claims being presented and show the proportion of claims that are rejected or from which litigation arises.

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*Paper presented before the Pacific Claim Agents' Association at its twelfth annual convention held at Butte, Mont., Aug. 25-27, 1921.

Such figures often guide the claim agent in determining the policies of the claims department. For instance, we undertook the experiment of temporarily abandoning the practice in vogue for years of immediately appraising all damaged automobiles regardless of whether a claim had been filed or how the accident occurred. By keeping a list of automobile accidents that developed into claims we saw the advisability of restricting our appraisals to only those automobiles involved in accidents where the carmen's reports indicated that the responsibility was uncertain or the extent of damage was considerable, or where claim was presented.

The adoption of this policy last year resulted in more than 19 per cent less automobile claims being presented in proportion to the number of automobile accidents that occurred as compared with the preceding year. In other words, we found that by an appraiser making an inquiry the day after the accident as to the extent of the damage to the automobile, owners of automobiles were encouraged to present claims.

The statistical record of pending claims, rejected claims, outlawed claims and litigated cases should serve to indicate to the claim agent any laxity in his work or if he is allowing too many claims to accumulate or suits to be filed. Perhaps his perspective has become so blinded that he is either too severe upon the claimant or too severe upon his own company in the rejection or granting of claims. The records of the department will immediately reflect such an attitude of mind.

In brief, statistics to the claim agent should be what a cost sheet is to a manufacturer, a steam chart and a steam gage to an engineer and a balance sheet to a banker. For is it not vital to claim agents to know the cost of their department, the work the department is doing, any fluctuations in that work and the stock of accidents on hand? Like a stethoscope, claim department statistics should disclose the heart beats of the department.

Investment Bankers' Association of America

The tenth annual convention of the Investment Bankers' Association of America will be held in New Orleans Oct. 30-Nov. 2. Headquarters will be at the St. Charles Hotel.

Illinois Association to Meet at Aurora on Oct. 14

The Illinois Electric Railway Association will meet at Aurora, Ill., Friday, Oct. 14. A special train over the Aurora, Elgin & Chicago Railroad will leave the Wells Street Terminal, Chicago, at 7:55 a.m., Central Standard time. A very interesting program is assured by Secretary R. V. Prather. This is the first meeting of the association since last fall. A full attendance is urged.

American Association News

More About Des Moines

In an article to be published in *The Nation's Business* for October, President P. H. Gadsden tells the story of the cessation of street car service in Des Moines, Iowa. He also tells something of the attempts the buses made to give service and points out the lack of substantial propositions by the bus interests to take over the transportation responsibilities. The title of the article is "The City Without a Street Car."

Meeting of the Executive Committee, American Association

THE Executive Committee of the American Association held its regular annual pre-convention meeting on Monday morning, Oct. 3. Among the matters before the committee was the resignation of Philip J. Kealy, second vice-president of the association, which had been accepted by President Gadsden at the time it was presented. This action was approved by the committee. Mr. Kealy said that his business interests were such that he could not continue to devote necessary attention to association affairs.

The committee authorized a special resolution with reference to the death of J. J. Landers, president of the Accountants' Association and member of the executive committee.

The committee considered the manner in which the W. O. Gibson case had been concluded and approved President Gadsden's action in making the agreement he had, which resulted in the parole sentence already referred to in these columns.

A special report from the electrolysis committee was given by W. J. Harvie, chairman. The executive committee approved this report, which included a recommendation for continued co-operation with the American Committee on Electrolysis, and also included a recommendation that $2,500 be appropriated by the American Association toward the expenses of the American committee, this being contingent upon similar action by the other associations represented on the committee.

Two subjects were brought up by the Committee on National Relations. One of these had to do with what policy the association had to follow in connection with the present case of the Washington Railway & Electric Company before the Interstate Commerce Commission, in which case the subject of the commission's authority over depreciated figures is in question as against the authority of the District and Maryland Commissions. No definite action was taken. The other question had to do with a situation which is at present facing a large number of electric railway companies in connection with excess profits tax. It appears that the Internal Revenue Bureau has decreased, by a very considerable amount, the investment figure of several railways for the 1917 income tax returns and this has in some cases placed the railways in the excess profits bracket, making them liable for payments ranging as high as $250,000. It is apparently a question of discretion in interpretation of the law and a special committee of five was authorized to consider the special problems and interpretations which might affect the electric railways as a whole in this important matter of taxation.

The committee adjourned after disposing of the usual routine matters and reports.

First Meeting of New Executive Committee

IMMEDIATELY after the close of the American Convention on Thursday noon the new president, R. I. Todd, called the newly elected executive committee into session with the following members present: Messrs. Ely, Harries, Henry, Gadsden, Todd, Budd, Shannahan, Coates, Stevens, Sawyer, Tontrup, Gould, Barry, Ellicott, Secretary Welsh and L. H. Palmer of Baltimore and H. V. Bozell of New York.

The committee took several steps which were necessary in order to start the machinery under the newly revised constitution, such as to authorize the executive secretary and treasurer to pay off ordinary routine office expenses, make provision for convention expenses, for protection of association property, etc.

The committee decided tentatively that its regular meeting shall be on the last Friday of each month except in November, which would make the meeting date fall on the day after Thanksgiving Day. The first meeting will thus be held on Friday, Oct. 28, and will be at the New York headquarters of the association.

A special vote of appreciation to President Gadsden for the energy and self-denial with which he had shouldered the difficult tasks subsequent to the defalcation was adopted.

The executive committee discussed the work of the publicity men and decided to do something to make this part of railway activity more effective. On motion of Mr. Budd the executive committee decided to communicate with the principal executives in companies which are not now engaged in publicity work asking them to pull together with the rest of the association in the general policy of railway publicity in the interests of the industry.

Mr. Todd appointed a finance committee of J. H. Pardee, chairman; R. P. Stevens and J. G. Barry, this committee becoming active immediately in order that the association machinery may not be held up due to lack of direct control over expenses which the finance committee exercises under the new constitution that was adopted at the annual convention.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Schenectady Award Ruinous

James F. Hamilton, president of the Schenectady (N. Y.) Railway, and H. B. Weatherwax, vice-president and general manager, when interviewed by the correspondent of the ELECTRIC RAILWAY JOURNAL at Albany in connection with the recent arbitration award between the Schenectady Railway and the Amalgamated Association, made the following statement:

> The purpose of the arbitration was to determine a fair and reasonable rate of wage to be paid the members of the association who were employees of the company, based on present existing conditions. The decision rendered was not based on existing conditions, but on a letter written by J. P. Barnes, former general manager, which was technically construed as continuing the 60-cent per hour rate of wage. As a matter of fact, the conditions of the letter were never carried out in that the Public Service Commission refused to grant the company all of the increases sought for and referred to in the letter, and such increases as were granted were not authorized until sixty days after the time contemplated by the parties and in no event was the 60-cent rate intended to extend beyond May 31, 1921.
>
> Under existing conditions the high rate of 60 cents an hour is entirely out of proportion to the wages paid for similar service throughout the State generally and is ruinous to the company financially. It cannot render present service under such an unreasonable rate of wage and in order to lessen the loss of this company, it will necessitate the immediate installation of one-man cars on all city lines. And even with the installation of one-man cars this company will be unable to pay war-time wages in times of peace without incurring great loss.

Electrification Urged

Residents of the surburban cities on the peninsula adjoining San Francisco recently presented a petition to the Southern Pacific Company asking the company to electrify the double-track steam line between San José and San Francisco on which interurban traffic is handled. All of the suburban cities between San Francisco and Palo Alto, a distance of 30 miles, are served by an excellent concrete highway which leads directly into San Francisco. In addition to a bus system and the steam railroad, which operates a commuters' schedule during the rush hours, there is also an interurban electric line that runs as far as San Mateo, 18 miles down the peninsula from San Francisco.

Still, there is an insistent demand for an electrified interurban service on a private right-of-way where high speed will be safe and where long trains can accommodate crowds during the rush hours, while small light units could be economically operated at reasonably frequent intervals during the off-peak hours.

In a letter addressed to Daniel C. Imoden, executive secretary of the peninsula bureau of chambers of commerce and civic associations at San Meteo, Cal., William Sproule, president of the Southern Pacific Company, gives his views on this proposed electrification. He said in part:

> High cost of money caused by the world war, excessive taxation, unequal competition by untaxed motor vehicles for hire over public highways which we were heavily taxed to build in the first place and are taxed to maintain afterward, with further competitive highway construction urged at this time, all combine of themselves to prevent the possibility of favorable answer to your call for electrification.

Paul Shoup, vice-president of the property, is also opposed to this electrification project on the ground that it would be an unprofitable undertaking.

In the absence of prospect for early electrification of the Southern Pacific steam lines, the Menlo Park Chamber of Commerce, stating that it was acting for all towns below San Mateo, adopted a resolution inviting the Western Pacific to extend its line northward into Santa Clara and San Mateo Counties. The president of this Chamber of Commerce, according to press reports, declares that plans are also being considered whereby the peninsula towns would build an electric line from Palo Alto to San Mateo so as to effect a connection there with the Market Street Railway.

Urges Relief from Paving Burdens

Jackson, Mich., has taken a forward step in recommending the abolition of the paving charges on the Michigan United Railways which operates in that city. A special committee, appointed by the City Commission of Jackson to investigate the affairs of the Michigan United Railways in that city, recommends that the company be relieved of the paving charge and also of the charge for sprinkling the streets it traverses, and furthermore the committee recommends that the company be given a 10-cent cash fare with five tickets for 35 cents and a 5-cent cash fare for children between the ages of five and twelve. This represents a substantial increase in the fares that have been charged in Jackson.

The report of this committee, which is constructive throughout, demanded that the company be maintained in a strong and secure financial position. It is attracting wide attention throughout the State of Michigan. The Michigan United Railways also operates in Lansing, Battle Creek and Kalamazoo and other Michigan cities as well as interurban cars between them.

In addition to these definite recommendations, this committee also recommends that

> Much could be done by the patrons of the street railway if they would educate themselves to the thought of assisting to expedite the service and avoid unnecessary delay. Loading and unloading the car is delayed by patrons, unnecessary stops are demanded, care is not taken by the people in calling for the right streets and in many other ways delays are forced upon the service which by a little forethought could be avoided and much of the waste eliminated.

Franchise Draft Expected

Progress Being Made Toward Conducting Negotiations Which Will End Des Moines Struggle

With the return to Des Moines on Oct. 6 of M. H. McLean and F. C. Chambers, president and general manager, respectively, of the Des Moines City Railway, there are evidences that actual progress has been made in the negotiations looking toward the end of the Des Moines street railway muddle. It is understood that Mr. McLean is coming to Des Moines to participate in the entire negotiations with the City Council and in the franchise election. It is likely that final draft of the franchise will be handed to the Council not later than Oct. 7.

Mr. McLean and Mr. Chambers were in Chicago on Oct. 5 in conference with representatives of the McKinley interests, owners of the Des Moines Electric Company, relative to the clause in the proposed franchise which permits the railway to sell electric power. One Des Moines daily published a story on Oct. 4 that the subject covered at the conference was the sale of railway plant to the McKinley interests, but this is not taken seriously by the business people in Des Moines. No officials of the city railway could be reached to verify or deny the report.

J. G. Gamble, attorney for Des Moines City Railway, was quoted in the daily papers on Oct. 4 to the effect that service on the basis of sixty cars could be available very shortly after the franchise ordinance is passed by the Council.

One of the reasons for Mr. Chambers' visit to Chicago according to Mr. Gamble was to prepare means for financing the resumption of service in the event the franchise is passed by the Council.

The police department took a firm hand in bus operation this week and ordered that buses must submit to brake inspection once a week by a city mechanician; that buses must be equipped with doors on Oct. 5 and that buses must not be opened until the vehicle has come to complete stop. Buses are also ordered to come to a complete stop at railroad crossings and are prohibited from stopping at street intersections.

A canvass of 12,000 Des Moines women by the women's bureau of the Chamber of Commerce completed on Oct. 5 showed 99½ per cent favored the electric railway as against the buses; 94½ per cent voted for the 8-cent fare franchise, provided fares are reduced when traffic increases. The vote will be placed in the hands of the City Council on Oct. 7. Sentiment has steadily crystallized in favor of the railway during the past two weeks.

Buses Must Be Regulated

Toledo Commissioner Insists Improved Railway Service Will Not Eliminate Jitney

W. E. Cann, commissioner of street railways, Toledo, Ohio, for the first time since he assumed this position seven months ago, has made public comment on the service-at-cost franchise of the Community Traction Company as it is being operated in his city. The occasion of Mr. Cann's public remarks was furnished by a recent newspaper interview in which Mr. Bradley, president and general manager of the Walding, Kinnan & Marvin Company and a member of the commission appointed by Judge Killits to draft the service-at-cost ordinance, discussed bus competition and suggested improved electric railway service as the means of offsetting jitney competition.

Service-at-cost became effective in Toledo on Feb. 1. Mr. Cann has selected the month of January, the month previous to the adoption of the service-at-cost, and August, the last month of operation under the ordinance, as fitting months for a comparative study of service-at-cost operation. He says in part:

> In the month of January, 1921, there were carried on the electric railway cars in Toledo 6,042,813 so-called revenue passengers. This figure includes the full fare passengers, children, purchased transfers and tickets or tokens and does not include free transfers or employees' tickets. In the month of August there were carried 4,608,393 revenue passengers, a decrease of 23.74 per cent. These figures graphically illustrate the decline in riding, and in this connection it might be well to remember that a material decrease in fare became effective on Feb. 1.
>
> Contrary to the general idea the introduction of a cheaper rate of fare did not act as a stimulus to business, for our records show that during January, passenger travel was at the average rate of 194,284 passengers per day, while in February our records show a drop to an average rate of 151,455 per day.
>
> Decrease in passenger travel, due entirely to the industrial situation, has been constant and uniform since the ordinance became effective. Such a marked decrease in travel would from a business standpoint warrant a decrease in car service.
>
> It is, and has been, my aim to operate this property on a business basis yet there are certain factors and elements incident to electric railway operation which prevent a decrease in service in direct ratio to the decrease in passenger travel.
>
> In January the Toledo Railways & Light Company operated 2,275 round trips per day. At the present time our schedule requirements call for 2,165 round trips per day, an actual decrease in service of 4.84 per cent, as compared with a decrease in the revenue passengers carried of 23.74 per cent.
>
> In January the average speed of all cars operated in the city was 8.79 m.p.h. This speed has been gradually increased to 9.54 m.p.h., so that on the majority of lines the actual running time from the outer terminus to the center of the city has been reduced from two to four minutes. While the effect of reducing the service has in some instances slightly increased the gap between cars, the additional time spent waiting for a car is more than offset by the time saved due to the increased speed of the cars.

Mr. Cann defended the cuts in service as "reasonable, and good business practice," and said that it was not his desire to boom the bus nor to assist in any form of unfair competition but to give Toledo the best and cheapest transportation system in America.

In reply to Mr. Bradley's suggestion that good railway service would absolutely eliminate the bus because the bus would have no business in the streets where car lines served, Mr. Cann said:

> This plan has already been tried out but until such time as buses are required to compete with street cars on a fair basis and are subject to the same rules and obligations as to service, routes, liability and taxes, they will continue to skim the cream of the transportation business, while the street cars must stand the brunt of furnishing continuous service during the periods of the day when travel is at a minimum and revenues fall far short of even meeting operating expenses.

"Distance Lends Enchantment"

Omaha is a long, long way from São Paulo, Brazil, but not so far as to keep Brazilians from admiring the type of electric car operated by the Omaha & Council Bluffs Street Railway, Omaha, Neb. It is reported that in looking over some magazines recently devoted to municipal undertakings some South American officials saw a picture of a car, No. 1001, used on the Farnam Street line in Omaha. No. 1001 is a type built by the local railway, seats forty-five passengers and costs $15,000.

Our Latin cousins were so favorably impressed with the picture of this car that they "up" and notified their agents, the Canadian Engineering Company, New York, to secure the plans of this vehicle. R. A. Leussler, vice-president of the railway, has sent the plans on to New York.

Industrial Publishing Added to Modern Curriculum

The New York Business Publishers Association announced on Sept. 23 the establishment of a course in industrial publishing. The course will include lectures, conferences, text books, problems, and a personal commenting service. Classes are now being organized in New York and will soon be organized in other publishing centers. The course can also be taken by correspondence.

Although the course is designed primarily for the benefit of members of the editorial and business staffs of trade and technical periodicals, it will be open to all who are interested in the field. It is intended not only to give instruction, but to develop the business as a whole by setting up higher standards of editorial and business service and showing how these standards can be attained. Among the topics covered are distinctive features of industrial publishing; its code of ethics; personal qualities required for success; determining editorial policies; getting the right kind of articles; securing accurate reports and data; writing for industrial papers; building up circulation; creating advertising; departmental management; service to the industry; service to advertisers; basic policies and tendencies. The editor of the fifteen text books to be used in this course is Henry H. Norris, managing editor of the ELECTRIC RAILWAY JOURNAL, who has received a leave of absence from this paper to undertake this work. Further information can be obtained from the secretary of the Course in Industrial Publishing, 185 Madison Avenue, New York.

Saginaw Rejects Municipal Bus Proposal

An effort by Commissioner Phoenix of Saginaw, Mich., to have necessary resolutions and an ordinance prepared by the city attorney looking to the establishment of a municipally-owned motor bus system received a setback at the hands of the Council on Sept. 27 when all members declined to support his motion to adopt a resolution authorizing the city attorney to proceed.

This and the statements of the commissioner that the jitney buses had failed to provide suitable transportation for Saginaw since the suspension of electric railway traffic nearly two months ago are the outstanding features in the efforts of the Council to provide an adequate means of carrying the people.

Since the road went into the hands of a receiver on petition of several of its creditors officials of the Saginaw-Bay City Railway have declined to make any statements as to when electric railway service might be expected to be resumed.

Sentiment seems to be gaining that the Council must do something to provide suitable transportation, and many are predicting that unless action is taken soon, jitneys will absolutely fail when winter comes. Even Commissioner Phoenix, friend of the jitney operator, has had a change of heart and publicly says, they are "dangerous" and cannot take care of the city's requirements. He has always leaned toward municipal ownership and asserts if the Council does not stand with him on the matter he will circulate petitions to the electors and force the adoption of municipal ownership.

It was Phoenix who proposed a jitney ordinance to regulate the buses, but after several conferences the measure has been forgotten. The buses are being run to suit the owners and people are riding at their own risk as none of the jitneys provide insurance in case of personal injuries.

Wages Cut Four Cents

A wage reduction of 4 cents an hour was made by the Los Angeles (Cal.) Railway on Oct. 1. A raise of 5 cents an hour was placed in effect in August, 1920, to meet the increased cost of living at that time. According to the railway's statement:

> The management realized that the men needed temporary financial relief and determined that the company should lose rather than its employees should suffer. The increase in wages has resulted in a great loss, which it can stand no longer. The cost of living has decreased somewhat and it will fall further. The condition is general throughout the country.

The new scale in cents per hour is as follows:

First three months	46
Next nine months	47
Second year	48
Thereafter	50

Safety car operators on shuttle lines will receive 2 cents an hour additional and on line cars will receive 4 cents an hour additional.

The Pacific Electric Railway has put into effect a similar cut.

Relief Suggested for Present Unemployment

President's Conference Confident Existing Situation Will Be Improved by Recognition of Principles It Has Laid Down and Compliance With Its Recommendations—Readjustment of Prices Essential to Promote Renewed Buying

TWELVE recommendations have been adopted by the President's Unemployment Conference for emergency relief in the present crisis. These recommendations lay down a standard procedure, urge in detail the resumption of certain classes of work and propose measures of relief applicable to manufacturing establishments.

The conference completed on Sept. 30 the first part of its work, the consideration of measures for emergency relief of unemployment, and then adjourned to meet again Oct. 10 in order to consider measures for preventing or mitigating unemployment periods in the future.

Organization of the conference was effected on Sept. 26 and the work divided among committees on statistics, employment agencies, emergency measures in public works, in manufacturing, in transportation, in construction, in mining and in shipping. These committees immediately got to work, and though it was not expected that they would be ready to report until Oct. 5, such progress was made that they presented their findings to the conference as a whole on Sept. 30 and adopted recommendations with reference to emergency measures. These recommendations follow in part:

METHODS OF PROCEDURE

1. The conference finds that there are, variously estimated, from 3,500,000 to 5,500,000 unemployed. There has been an improvement, but pending general trade revival this crisis in unemployment cannot be met without definite and positive organization of the country.

2. The obligation of meeting the emergency of unemployment is primarily a community problem. The responsibility for leadership is with the Mayor and should be immediately assumed by him.

3. The basis of organization should be an emergency committee representing the various elements in the community. This committee should develop and carry through a community plan for meeting the emergency, using existing agencies and local groups as far as practicable. One immediate step should be to co-ordinate and establish efficient public employment agencies and to register all those desiring work It should co-ordinate the work of the various charitable institutions. Registration for relief should be entirely separate from that for employment.

4. The personnel of the employment agencies should be selected with consideration to fitness only and should be directed to find the right job for the right man and should actively canvass and organize the community for opportunities for employment. The registry for employment should be surrounded with safeguards and should give priority in employment to residents. Employers should give preference to the emergency employment agencies.

5. The emergency committee should regularly publish the numbers dependent upon them for employment and relief that the community may be appraised of its responsibility. Begging and unco-ordinated solicitation of funds should be prevented.

CLASSES OF WORK URGED

6. Private houses, hotels, offices, etc., can contribute to the situation by doing their repairs, cleaning, and alterations during the winter instead of waiting until spring, when employment will be more plentiful.

7. Public construction is better than relief. The municipalities should expand their school, street, sewage, repair work and public buildings to the fullest possible volume compatible with the existing circumstances. Municipalities should give short time employment the same as other employers.

8. The Governor should unite all state agencies for support of the Mayors and, as the superior officer, should insist upon the responsibility of city officials; should do everything compatible with circumstances in expedition of construction of roads, state buildings, etc.

9. The federal authorities, including the Federal Reserve Banks, should expedite the construction of public buildings and public works covered by existing appropriations.

10. A congressional appropriation for roads, together with state appropriations amounting to many tens of millions of dollars already made in expectation of and dependence on federal aid, would make available a large amount of employment. Notwithstanding the necessity for economy, the conference under existing circumstances recommends congressional action at the present session in order that work may go forward.

11. The greatest area for immediate relief of unemployment is in the construction industry, which has been artificially restricted during and since the war. We are short more than a million homes; all kinds of building and construction are far behind national necessity. We recommend that the Governors summon representative committees, with the co-operation of the Mayors or otherwise as they may determine, to (a) ascertain facts; (b) to organize community action in securing adjustments in cost, including removal of freight discriminations, and clean-out campaigns against combinations, restrictions of effort and unsound practices where they exist, to the end that building may be fully resumed.

12. Manufacturers can contribute to relieve the present acute unemployment situation by:

(a) Part time work, through reduced time or rotation of jobs.

(b) As far as possible, manufacturing for stock.

(c) Taking advantage of the present opportunity to do as much plant construction, repairs and cleaning up as is possible, with the consequent transfer of many employees to other than their regular work.

(d) Reduction of the number of hours of labor per day.

(e) The reduction of the work week to a lower number of days during the present period of industrial depression.

Employees and employers are urged to co-operate in putting these recommendations into effect.

A large number of employers have already, in whole or in part, inaugurated the recommendations herein set forth, and for this they are to be commended, and it is earnestly urged upon those employers who have not done so to put same into use, wherever practicable, at the earliest possible opportunity.

12. Specific methods for solution of our economic problems will be effective only in so far as they are applied in a spirit of patriotic patience on the part of all our people.

During the period of drastic economic readjustment through which we are now passing the continued efforts of any one to profit beyond the requirements of safe business practice or economic consistency should be condemned. One of the important obstacles to a resumption of normal business activity will be removed as prices reach replacement values in terms of efficient producing and distributing cost plus reasonable profit.

We, therefore, strongly urge all manufacturers and wholesalers who may not yet have adopted this policy to do so, but it is essential to the success of these measures when put into effect that retail prices shall promptly and fairly reflect the price adjustment of the producer, manufacturer, and the wholesaler.

When these principles have been recognized and the recommendations complied with, we are confident that the public will increase their purchases, thereby increasing the operations of the mills, factories and transportation companies, and consequently reducing the number of those out of employment.

Commission Procedure Outlined in New York

Public Hearings Next Step in Considering Transit Board's Recommendations—Politicians See Sinister Influence at Work

As was made plain in the last issue of the ELECTRIC RAILWAY JOURNAL the plan advanced by the New York Transit Commission for a settlement of the traction problem in that city is only a preliminary outline. The commission has taken the attitude of not commenting on the matter for publication, but the members have met the daily newspaper men to answer informally such questions as might be asked. It is understood, however, that when all the criticisms and objections, both constructive and obstructive, have been filed they will be met by a statement from the commission.

AS THE next step in furtherance of the adoption of the plan it is proposed to institute a series of public inquiries, the first of which will be set for an early date, at which the several companies will be subjected to further examination as to their affairs and in particular as to their attitude toward the plan. At these hearings an opportunity will be afforded for criticism and constructive suggestion. In conducting these inquiries, the commission, under the law, will have all the power of a committee of the legislature.

VALUATION WORK BEING CONCLUDED

Until these public examinations have been held and until the work of valuation has been finished, the commission will not undertake to present in complete form what might be called the statutory plan. As for the valuation itself that work is rapidly being completed. Under it valuations according to existing security issues and present capitalization will be disregarded and the entire financial structure of the consolidated company will be based upon a new valuation.

The statement was made beyond peradventure by the commission that it would require that the rate of fare for the first year following the initiation of the plan should remain at 5 cents. The commission has further concluded that until there has been ample demonstration of the general results of the new plan and until the changes and economies the plan has in view are tested fully, there shall be no change in the present rate of fare.

POLITICIANS QUICK TO REPLY

This would seem to be too plain to be successfully controverted. To Mayor Hylan, however, the unmistakable intent of the commission as so expressed apparently means nothing. He sees in it all a deep laid plot. According to him the real plan will be disclosed after election. Its character, so the Mayor says, will depend "according to whether or not a Board of Estimate is elected for the city that will adhere to the policies of the present administration in preserving the public rights with respect to traction contracts and the inviolability of the 5-cent fare, or whether a complacent set of men is elected with aid of the delusive bait in this 'preliminary plan' to do as the traction interests bid." It is "gratifying" to the Mayor to find in the plan a provision for the use of buses to supplement the traction lines.

It was not until Tuesday that the comment of the Mayor appeared. His associates in political office, however, were less prone to delay. Those who took it upon themselves to comment upon the report before a day had elapsed after its presentation were Comptroller Charles L. Craig, Commissioner of Accounts Hirschfield, Corporation Counsel O'Brien and the presidents of the Boroughs of Brooklyn, Queens, the Bronx and Richmond. While the characterizations of the report by these gentlemen varied in particulars they all professed to see in the commission's statement malign influences at work. Mr. O'Brien referred to the report as a "concededly incomplete and camouflaged pronouncement."

To the newspaper men the railway officials with one exception asked for time in which to consider the commission's statement carefully. The exception was H. Hobart Porter, vice-president and general manager of the Brooklyn City Railroad. "From first reading," said Mr. Porter, "I felt that the commission had made a very comprehensive study of the situation and had prepared and submitted a plan which if the details for its execution could be acceptably worked out might prove a final solution for the transit situation here."

NEWSPAPERS SYMPATHETIC

With the exception of the Hearst papers both the afternoon and the evening newspapers are a unit in declaring in substance that back of the plan may lie the means for straightening out the affairs of the companies and bringing to an end conditions which have resulted in receiverships and the disintegration of the various systems, with the concomitant advances in fares in many instances and the lessening in nearly all cases of the value of the companies to the public in the service which they furnish.

Wage Arbitrators Drafting Decision

The arbitration committee in the wage controversy on the Connecticut Company's lines met at New Haven during the week ended Oct. 1 and after discussing the evidence submitted by both sides at recent hearings adjourned without reaching any definite conclusion.

It was agreed that Justice Beach, the third or "neutral" arbitrator, would present his ideas for review at a future meeting of the committee. The two other arbitrators will then suggest changes or alterations which will be gone over and discussed and an outline for a final decision arrived at if possible.

Joseph F. Berry, Hartford, the Connecticut Company's representative on the committee said:

> At a future meeting we will take up this draft for consideration. It might be adopted just as he draws it, or one of the others of us might have changes or alterations to offer. It is unlikely that Justice Beach's proposals will be made public before they have been taken up by the full committee.

City Council Will Consider New Franchise

With the hope and intention of making extended improvements and betterments to its system the Dubuque (Ia.) Electric Company, through its vice-president and general manager, has requested the City Council to call for a special vote of the people on a new twenty-five-year railway franchise.

Mr. Maynard, vice-president of the property, in a recent letter to the City Council reviews the after-war financial distress which has prevented his company expending any funds on additions, the dawn of prosperity which is about to break and his anxiety for Dubuque to be prepared to meet the changed conditions in order to supply the increasing need for transportation facilities. Production means must therefore be increased at once for new installations will require a great deal of money, time and labor.

In discussing the need for capital Mr. Maynard stressed the point that it was impossible to market a bond which outruns the present franchise and pointed out the limited market that exists for a short-term bond and the burdensome terms such financing would entail. With a guarantee of continued service in the city limited to five years and some months under the present franchise the financial difficulties attendant upon any new financing would appear insurmountable. But with a guarantee to the investors of a twenty-five-year grant improvements could be readily financed.

In its proposed franchise draft submitted by the company it does not fix the rates of fare to be charged, but leaves the matter of fixing just and reasonable rates to the City Council. Provision is also made for conducting negotiations for the purchase of the property by the city.

The new franchise would be effective following the passage of the ordinance by the City Council and the subsequent adoption by the people of Dubuque.

According to the Dubuque *Journal* the proposition deserves the serious and careful consideration of all voters. In a recent comment this paper says that if the granting of a new franchise would give Dubuque something better than it now has it would appear to be a wise step.

Purchase Price Fixed

$2,297,277 Fixed as Sum Detroit Shall Pay for "Day-to-Day" Detroit United Railway Lines

According to a report of the board of arbitration which was chosen to determine the price the city of Detroit will have to pay the Detroit United Railway for the 29½ miles of day-to-day lines, the price set for the lines and equipment is $2,297,277. This includes $1,605,000 for the trackage and $692,277 for 105 double-truck cars and 25 trailers and other miscellaneous equipment. The decision of the board was unanimous. The arbitrators were Prof. Henry E. Riggs, representing the railway, William H. Maybury representing the city and W. E. Davis, Cleveland, chosen by Messrs Riggs and Maybury.

Lines Built Recently

The lines covered by the decision of the arbitrators were built by the company under day-to-day agreements which gave the city the right to purchase the lines whenever it was ready to operate them, the price to be paid to be based upon costs less depreciation. They include the Twelfth Street, Grand Belt and Hamilton lines, some of the company's later construction built between 1912 and 1920. With the trackage are included all necessary sidetracks, turnouts, curves, switches, spurs, connections, wires, poles, overhead power equipment. special work, crossings and equipment constructed under Council resolutions or contracts together with equipment necessarily furnished and acquired by the company for the operation of its cars over these tracks. The acquisition of these lines by the city was authorized at the election last April and they will be paid for out of the $15,000,000 municipal street railway bond issue authorized in April, 1920.

With approximately 60 miles of municipal lines constructed, the acquisition of the day-to-day lines will add approximately 50 per cent to the extent of the municipally owned system.

Working Agreement Suggested

In their report the arbitrators cite that in so far as it is possible to guarantee the protection of both parties it is desired to do so, and they recommend that the operating officials of both parties meet and draw up an agreement which will fully cover and protect certain points which developed during the hearing, and similar cases which may arise later. These points include the granting of running rights to each party over the other's tracks after the lines are taken over, to preserve the continuity of the existing lines. The arbitrators report that while there is nothing in the day-to-day agreements that specifically grants any authority to the arbitrators in this matter, they feel they would be remiss in their duties if they failed to direct attention to the fact that at four points at least, and undoubtedly at others as well there are and will be openings left for serious contention and considerable annoyance to the patrons of both sides. This is termed an operating matter which must be cured by an agreement between the parties so as to secure harmonious co-operation between the two transportation systems of the city for the benefit of the riding public. The arbitrators further recommend that if it develops that the parties can not agree on the terms of such a contract the matter be referred to a disinterested board of arbitration in lieu of resorting to litigation.

In advising the city to take over the lines and equipment at once or to make provision for taking care of the cars, the arbitrators cited that in the event that there should be a delay in the taking over of this property by the city, there is a moral reponsibility on the Detroit United Railway to see to it that this equipment is fully maintained and that these particular cars are given fully as much or more care in the matter of running repairs and general upkeep as is given to the other new and modern equipment of the company. While the same comment is applicable to all property, it is believed to be particularly necessary regarding this equipment as neglect for a period of a few months would inevitably result in serious depreciation and might put the city to materially heavier costs of repairing than would be the case were the cars taken over now.

The board of arbitrators held its first hearing on July 19 and the last formal hearing was on Sept. 12. In all, twelve days were consumed in taking testimony. Over twenty witnesses were examined and a large amount of evidence and many data in the form of exhibits, reports and maps were studied.

It is anticipated that the lines acquired from the Detroit United Railway will be operated as part of the municipal street railway system as soon as the Street Railway Commissioners have completed the necessary transfers, and as soon as the street railway department has installed special track work connecting the lines with the municipal railway lines already built. This work of connecting the two systems can be commenced immediately by the city department.

Houston Decides Against Franchise

The proposed new franchise for the Houston (Tex.) Electric Company, a Stone & Webster property, which includes the electric railway lines and the lighting privileges in Houston, was defeated in a decisive vote at the special election on Oct. 4. The vote was the lightest total vote polled in a city election in recent years. Only four small city wards favored the franchise, one was tied and the others decidedly against.

Mayor Holcombe said after the election that the City Council would at once begin the work of drafting a traction franchise that would be approved by the citizens. He said further that railway service in Houston must be improved and that this would be the main consideration in the drafting of the new franchise.

Denounces City Scheme

Justice James C. Cropsey, in the Supreme Court, Brooklyn, N. Y., denied the application by the city to start condemnation proceedings against three streets in Queens on the grounds that the city was actually attempting to get possession of the lines of the North Shore Traction Company and operate the cars.

The city claimed that the three streets were needed to complete boulevards. The Judge decided the city had no authority to go into the business of operating street cars and that if some property were desired by the city which did not belong to the North Shore Traction Company such an application might be granted.

$1,000,000 Expenditure Suggested to San Francisco Municipal Railway

An entirely erroneous impression has been caused by accounts telegraphed to the papers in the east from San Francisco referring to the probable expenditure of $8,101,000 by the city of San Francisco, Cal., in extending its municipal railway system. It is said that this expenditure was recommended to the Board of Supervisors in a report by M. M. O'Shaughnessy, city engineer. A telegram to the ELECTRIC RAILWAY JOURNAL on Oct. 5 from its Pacific Coast editor resident at San Francisco says that the $8,000,000 figure is erroneous. It resulted from the reporters summarizing the cost of alternative routes. Even if all the proposed lines were built the total cost, excluding tunnel assessments, would be only about $1,000,000. In the following all mileages are double track. Four new lines under consideration include:

1.57 mile extension on Masonic Avenue	$225,000
0.88 mile line on Traval Street	120,000
0.91 mile line in Ocean View District	175,000

The Sunset district line would extend from the Ocean Beach along Judah Street connecting via tunnel with the present municipal lines for a direct route to the ferry. Estimates on four alternative tunnel routes for this line ranged from a total cost of $914,000 to $2,467,000. Of these totals the municipal railway funds would be needed only for track construction and an assessment district would be formed to cover the tunnel cost. Of these Sunset line alternatives Mr. O'Shaughnessy favors the 4.54-mile route using a 4,200-ft. tunnel on Duboce Avenue with track cost of $576,000 and tunnel cost of $1,900,000. Mr. O'Shaughnessy has reminded the board that these new lines will require $800,000 additional for equipment and carhouse. These estimates were made by Mr. O'Shaughnessy on request of the board.

Financial and Corporate

P. R. T. Net for Eight Months, $936,583

The total operating revenue of the Philadelphia (Pa.) Rapid Transit Company for the eight months ended Aug. 31, 1921, was $28,170,950. Of this amount $27,555,073 was passenger revenue. After deducting fixed charges amounting to $6,552,816 the net income for the period amounts to $936,583 against a deficit of $151,779 for the same period a year ago. The accumulated deficit for the twenty-month period to Aug. 31 now stands at $1,181,351.

The largest amount in passenger revenue for the first seven months of this year was realized in May when $3,686,931 was collected from 74,455,275 passengers. The month of February was lowest in traffic with a total of 63,033,838 passengers carried amounting to $3,140,820.

The total number of passengers carried from January through August inclusive was 555,773,826 against 605,581,130, a decrease of 49,807,304 over the same period a year ago. While the traffic handled decreased, the passenger revenue increased $3,322,937 over the first seven months of 1920.

Another Effort to Restore Shore Line Railway

It is reported that another effort is being made to restore the Shore Line Electric Railway between New Haven and New London. The latest proposal to this end comes from a Delaware corporation known as the Finance & Reorganization Company, New York. It outlines the plans as follows:

> Subscription blanks for the new company set the amount of money to be raised at "not to exceed $4,000,000 of 7 per cent first mortgage gold bonds" and "common stock of the par value of $100 each, an issue not to exceed 7,000 shares."
>
> Stocks and bonds are to be of a corporation to be known as the Shore Line Traction Company, a Connecticut corporation. In the subscription blank it says "In consideration thereof, the said Finance & Reorganization Company agrees to assign and transfer to the Shore Line Traction Company the part of the trolley line formerly belonging to the Shore Line Electric Railway between New Haven and Chester, in operating condition, with a power house and transmission line for said company for an amount not to exceed $900 000 in 7 per cent first mortgage bonds and 7,000 shares of common stock of the said Shore Line Traction Company."

Under the plan it seems apparent that the Finance & Reorganization Company would control all the securities of the Shore Line Traction Company with the exception of $100,000 of its bonds.

The subscription blank says that in the event that the company shall not succeed in selling $205,000 in bonds and $205,000 par value of stock any amount which shall have been paid shall be refunded.

When the company has sold bonds in the amount of $205,000 it will make demand for the payment at the purchase price or any part remaining unpaid to be used in the purchase of the property of the Shore Line Electric Railway.

Accumulated Dividends Financed

Financial Structure of Portland Company Rearranged to Suit Changed Conditions

Plans have been perfected for readjusting the capitalization of the Portland Railway, Light & Power Company, Portland, Ore., to bring it more nearly in line with the present requirements of the company. Hard hit by the industrial depression following the declaration of war in 1914, all dividends on the stock of the company were suspended. Progress of the company since then has been steadily forward with the result that it was recently felt that the financial structure of the company should be changed in the interest of the security holders deprived of their incomes, particularly as the earnings now justify the payment of first preferred dividends.

While the credit of the company to profit and loss amounts to more than the total of the accumulated dividends, the cash has been expended on improvements and for the payment of sinking funds and it was therefore desirable that the accumulated dividends should be paid in some other way than in cash. As a matter of fact the value of the stock equity in the property was increased by $6,625,000 while the stockholders were receiving no return.

The plan hit upon was to declare a dividend of 27 per cent on the first preferred stock, payable 2 per cent in cash and 25 per cent in first preferred stock at par. The stock issued in payment of this dividend will be cumulative from Oct. 1, 1921. In anticipation of this move the stockholders approved the plan for the change in the financial structure of the company, including the authorization of $10,000,000 of prior preference stock and increased the first preferred stock by $2,500,000. The capitalization of the company, following the consummation of the new plan, will be as follows:

	Authorized	Outstanding
Cumulative prior preference stock	$10,000,000	———
Cumulative 6% first preferred stock..	7,500,000	$5,000,000
Non-cumulative 6% second preferred stock	5,000,000	5,000,000
Common stock....	20,000,000	11 250,000

The stock outstanding prior to the consummation of the present plan was as follows:

6% Cumulative first preferred stock	$5,000,000
6% Non-cumulative second preferred stock	5,000,000
Common stock, 75% paid ($11,250,000) and liable to calls up to 25%	15,000,000

The $15,000,000 of common stock outstanding has been over 75 per cent paid. This part paid stock will be retired and full paid stock issued to the amount paid in. The stockholder will then be released from all liability for the 25 per cent unpaid upon the part-paid stock. This requires the issuance of only $11,250,000 of full paid common stock.

The first preferred 6 per cent stock outstanding was issued $2,500,000 on Jan. 1, 1916, and $2,500,000 on April 1, 1917. There had accumulated on the $2,500,000 first issued 7½ per cent up to April 1, 1917, and this was paid in cash on July 1, 1921, thus making the entire amount of $5,000,000 of 6 per cent first preferred stock alike in the accumulation of dividends from April 1, 1917, which up to July 1, 1921, amounted to $1,275,000.

The $10,000,000 of 7 per cent prior preferred stock will probably be issued in series. The right is reserved to the stockholders to change the dividend rate and the redemption features. President Franklin T. Griffith of the company explains that the issue of the new stock was authorized to give the people of Oregon an opportunity to invest their savings in an Oregon enterprise. According to Mr. Griffith the company "will market it from time to time, as we need money, or as our friends are willing to buy. The money will all be used for the betterment of the property."

The company is out of debt except for funded and current obligations.

Splendid Return in July in Dallas

The Dallas (Tex.) Railway's report covering operation in July shows a considerable falling off in the number of passengers carried as compared with the number carried in June. Revenue passengers carried during June numbered 4,251,054, while for July the number was 4,097,755, a decrease of 153,299. Figures for July, 1920, show that a total of 4,298,150 persons were carried during that month.

Despite the falling off in the number of revenue passengers carried, the company broke all past records in amount and rate of returns. While the rate of return on the agreed valuation authorized by the franchise is 7 per cent, the return for July amounted to 8.67 per cent.

The return for July permits the setting aside of $13,146 for reserves, the largest amount set aside in any one month in the history of the company. Total gross receipts were $264,639, while operating expenses amounted to $196,470. This return was made before the recently announced 10 per cent reduction in wages of all employees became effective. The service maintained in July showed practically no change in car-miles operated.

$59,678 Loss in Eight Months in East St. Louis

The East St. Louis & Suburban Railway East St. Louis, Ill., is informing the public of its difficulties through the columns of local newspapers. In a recent statement President W. H. Sawyer shows that the company in the eight months ended Aug. 31, last, was short $59,678 of earning the revenue to which it is entitled under the valuation and interest charges granted by the Illinois Public Service Commission.

In this period there was a decrease of 20.05 per cent in the number of passengers carried as compared with the corresponding period of 1920. "But it seems that we reached bottom in August," says Mr. Sawyer, "for there was an increase in August over July." He predicts that the next three months will show a gradual increase in travel. In the meantime service has been cut slightly, though passengers are being handled as heretofore, and the public is informed of the conditions.

Montreal Has an Accumulated Deficit of $1,967,834

The Montreal (Que.) Tramways reports record gross earnings of $11,773,004 for the fiscal year ended June 30 compared with $10,782,470 for the preceding year. The balance after operating expenses and taxes and maintenance and renewals was $2,868,667 compared with $2,695,394 a year ago. Allowances due the company on this balance by the Tramways Commission based on the franchise was $2,489,959 compared with $2,452,269 in the preceding year. The balance of $378,707 was not sufficient to meet the city's rental allowance and required contingent reserve totaling $617,730 by $239,022, this deficit comparing with $364,700 a year ago. The accumulated deficit on that account since the going into effect of the new franchise in February, 1918, is $1,967,834.

Revenues Exceed Current Expenditures of $65,506

During the receivership for the Ohio Electric Railway, Springfield, Ohio, between Jan. 26 and July 14 the excess of revenue over current expenditures was $65,506. The income was $2,725,046 during the period. These facts were noted in the receiver's report made to Federal Judge John M. Killits at Toledo by B. J. Jones, Columbus.

In the disbursements the items for which the largest sums went were: Payroll, $944,640; materials, $286,722; fuel, $215,501; injuries and damages, $5,018; taxes, $39,487.

The last two weeks of the period showed disbursements of $197,877; of which $77,375 went to pay help.

The receiver's account of J. H. McClure in the case of the Indiana Columbus & Eastern Traction Company from July 15 to 31, showed receipts of $137,321, of which $33,499 was on hand at the beginning of the period, and disbursements of $105,871.

The lines accounted for in the bills of the Ohio Electric included the Columbus, Newark & Zanesville Electric Railway, the Indiana, Columbus & Eastern Traction Company, and the Fort Wayne, Van Wert & Lima Traction Company.

Fewer Passengers Carried in August

The report of the Seattle (Wash.) Municipal Street Railway, for the month of August showed that while the car riders paid about 33⅓ per cent higher fare than in August, 1920, the receipts were only 4.2 per cent higher, and that 2,025,911 fewer passengers rode. The passenger decrease was 20.3 per cent. The report, which was prepared by Superintendent of Public Utilities Carl H. Reeves, showed receipts for August, 1921, of $524,743 as compared with $503,599 for August of last year.

In August, 1920, 9,964,100 passengers were carried, while in August of this year, only 7,938,189 passengers rode on the municipal lines. The car-miles and car-hours of operation also went down, as evidenced by figures showing 1,328,438 car-miles in August of last year compared with 1,311,086 car-miles in August this year. In August, 1920, $400,656 was expended in operation and in August of this year $367,070.

Valuation of Traction Properties Fixed

The Oklahoma State Board of Equalization has fixed valuation for purposes of taxation on Oklahoma traction and interurban lines as follows: Oklahoma Gas & Electric Company, $4 254,831; Muskogee Gas & Electric Company, $1,395,063; Enid Railway, $75,000; Chickasha Railway, $25,000; Guthrie Railway, $25,000; Lawton Railway, $59,000; Muskogee Traction Company, $335,000; Oklahoma Union Railway, Tulsa. $350,000; Okmulgee Northern Railway, $207,000; Oklahoma Railway, Oklahoma City, $3,118,586; Pittsburg County Railway, McAlester, $400,000; Sapulpa Interurban Company, $50,000; Shawnee-Tecumseh Traction Company, $55,000; Tulsa Street Railway, $300,000.

Interurban Rental Advanced

By a recent order of the Michigan Untilities Commission an advance of practically 100 per cent has been allowed in rental charges to be paid by the Grand Rapids, Grand Haven & Muskegon Interurban Railway to the Muskegon Traction & Lighting Company for use of the latter's tracks in the city of Muskegon, Mich.

Under the new ruling the interurban must pay annually $4,000 for use of tracks, two-fifths of local fares, 2 cents for every through passenger and 10 cents per freight-car mile for all freight moved over city tracks. The old contract called for a rental of $2,000 with a 1-cent charge for every passenger.

$288,850 Taken by Jitneys from Municipal Railway

Figures prepared by the Department of Public Utilities of the City of Seattle show that the jitney service during the year 1920 deprived the Seattle Municipal Railway of approximately $288,850 in revenues, derived from carrying 3,610,724 passengers. The above estimate is based on an average fare of 8 cents, taking into consideration the fact that car riders pay 8⅓ cents for tokens, a 10-cent cash fare and also use transfers.

Toledo August Deficit Only $20,098

The report made by Street Railway Commissioner Cann of Toledo, Ohio, shows that the August deficit of the Community Traction Company was only $20,098. This is less than half the July deficit. In January, before the Community Traction Company took over the lines, the number of passengers carried at a 7-cent fare and 2-cent transfer was 6,042,000. At no time since has the fare been that high and yet in August the total number of passengers carried was 4,608,393.

Mr. Cann believes that the industrial slump is almost entirely to blame for the showing. He points out that so far September figures show that the tide has turned. Checks have shown that the bus business has also decreased considerably.

The financial report shows that the Community Traction Company has cash in various funds set up amounting to $267,905, including $51,032 in the sinking fund, which represents city ownership in the system. However, in other funds there is a combined deficit of $377,074, the greater part of which is in the stabilizing fund.

The increase of gross revenue during August was $21,233. A part of this represented one-fifth of the rebate due on power since the new contract with the Toledo Railways & Light Company was signed.

Toledo Bonds Offered

The Toledo Traction, Light & Power Company, Toledo, Ohio, is offering $2,500,000 first lien 7 per cent gold bonds for subscription through a syndicate.

The company owns 93 per cent of the common stock of the new Toledo Edison Company, the successor to the Toledo Railways & Light Company, and also controls all of the $1,500,000 of preference stock of the company.

This offering is a part of the comprehensive plan of financing all of the electric power, lighting, gas, heating and railway property of Toledo. The holding company has pledged a large portion of the 6 per cent bonds of the Community Traction Company as security for the present issue of bonds.

A loan of $12,000,000 will be retired through the new financing. This will release the railroad property directly from all obligation except the bonds of the Community Traction Company.

Traffic and Transportation

No Fare Referendum in Cincinnati

A referendum on the recently enacted ordinance reducing fares on the lines of the Cincinnati (Ohio) Traction Company will not be held at the November election if the report filed with the Ohio Supreme Court at Columbus is approved by that body. The report was filed by Hugh L. Nichols, former Chief Justice of the Supreme Court of the State of Ohio, who was appointed to hear the testimony in the city of Cincinnati's protest against the referendum. It shows that a total of 5,312 signatures appearing on the referendum petitions circulated by the Citizens' Committee have been withdrawn or stricken off by order of Judge Nichols.

The petitions originally contained 14,574 signatures and after the above number had been deducted the petitions lack sixty-two signatures of the number necessary to warrant a referendum. The report of Judge Nichols if sustained by the Ohio Supreme Court will knock out the referendum petitions against the ordinance and franchise amendment which have reduced fares since Aug. 1. The ordinance and franchise amendment under which the Cincinnati Traction Company is operating also provides that fares shall be reduced another half cent to 7½ cents on Nov. 1.

The Ohio Supreme Court has since refused the writ of mandamus filed by the Citizens' Committee seeking to compel the city auditor to certify petitions for a referendum to the Board of Elections. The decision of the court gives the city a victory on the fare question. The ruling was made after the report of Judge Hugh Nichols, who sat as umpire, had been presented.

The ordinance in question was passed by the City Council last June, and provided that if the city conceded deferment of the payment of the franchise tax by the traction company until next year a reduction of one-half cent in fares would become effective on Aug. 1 and a further reduction would be made on Nov. 1 to 7½ cents. In addition the company would be compelled to grant the reduced rate to children attending public, parochial and high schools.

The extension of the time granted for the payment of the franchise tax was deemed to be merely technical since under the terms of the franchise the tax is to be paid only when it is earned, but deferred payments become cumulative. The traction company did not earn the tax last year, nor for the period this year preceding the passage of the ordinance.

As stated previously the fraudulent signatures together with those withdrawn by request reduced the number to less than legal requirement. Thereupon the Citizens' Committee attempted to file petitions containing 700 additional signatures, but the city auditor refused to accept them upon the ground that the time allowed by law in which to file the petitions had lapsed and he had no legal right to include the additional names. The Citizens' Committee then filed the mandamus suit in Supreme Court. Former Chief Justice Hugh Nichols was named Master Commissioner to hear testimony and file his conclusion regarding the facts with the court.

Unlimited-Ride Weekly Pass Started at Youngstown

The Youngstown (Ohio) Municipal Railway placed in operation, beginning Monday, Oct. 3, a weekly unlimited-ride, transferable pass similar to that in use at Racine, Wis., for the past two years and adopted for Kenosha in January, 1921. The price of the pass is $1.25 as against a cash fare of 9 cents and a ticket fare of 8⅓ cents (six for 50 cents). One advantage expected from the pass is the capture of riders using the 10-cent jitneys. The jitneys are almost entirely of touring-car type, the jitney bus being unable to compete with the smaller and swifter pirate.

Preceding the introduction of the pass, cards printed on both sides (with the side showing fewer words but bigger type facing the auto-rider and the walker) were displayed in the cars and advertisements run in both the daily English and weekly non-English papers. News stories and interviews concerning the use of the pass were also arranged for. Calls were made on the leading department stores, all of which agreed to place passes on sale during the introductory period, several going so far as to give an "ear" or box-head to the pass in their own advertising copy.

The downtown theaters and cinemas were canvassed, and these agreed to accept and display slides referring to the pass. The co-operation of the Y. M. C. A. and Y. W. C. A. was also gladly given. All of these interests—stores, theaters and schools—realized the possibilities of the pass to them in its encouragement of off-peak riding. Talks were given to the car operators and before the Kiwanis Club. Preparations have already been made for follow-up publicity to be suitable to the weather and other conditions that cause changes in riding.

Passes are placed on sale the Friday of the week (Monday a.m. to Sunday midnight) preceding the use of the pass, and sales are continued up to Wednesday of the week in which the pass is valid. The sales for the first week (Oct. 3-Oct. 10) were reported as 4200.

Jail Sentence for Broomhead, Jitney Operator

The first jail sentence for lawless jitney operators in Albany, N. Y., since the United Traction Company began its fight against the jitneys was imposed on Oct. 4 by Justice Harold J. Hinman. Frank Broomhead, Cohoes, was the offender. He must serve thirty days in the Albany County jail on a charge of criminal contempt of court for the second time.

Broomhead had been served with the injunction restraining illegal competition with the United Traction, but continued operating his jitney between Cohoes and Troy. The temporary writ of injunction was made returnable before Justice Hinman on Sept. 10. Broomhead was one of the eleven men who were charged with contempt of court. He was accordingly fined $100 by the judge.

On proof that the jitney business was being carried on by Broomhead on Sept. 17 and 19 the United Traction went further in the proceeding. At a subsequent hearing Justice Hinman reviewed the testimony and declared that there were inconsistencies in Broomhead's defense and that no credence could be given to his statements. Justice Hinman's finding follows in part:

> The court recognized the state of mind which had been permitted to prevail among the so-called jitney operators that even though the Appellate Division had held their acts to be a crime the processes of the criminal law were inadequate to punish them and that somehow they were above the law. So they continued openly and flagrantly to violate the law and held it in almost perfect contempt until it became apparent that the lawless of this section of the State were being schooled to become more lawless, the thoughtless among us to lose what respect they may have had for law and order and the sober minded and far sighted to feel uneasy for the future when the law could be so flagrantly defied with impunity.
>
> It is the policy of the law to deal more gently with first offenses wherever possible, but the willful renewal of the offense cannot be tolerated. It must be dealt with sternly and the charge made here against the respondent, Broomhead, is that he has repeated the offense at least twice since receiving punishment and kindly admonition. If guilty, it is my duty to impose a more severe penalty this time as punishment to him and as a warning to others.

Fare Reductions Sought in Connecticut

Fare on electric railways will be considered by the Connecticut Public Utilities Commission at Hartford on Oct. 18 and 19. The first hearing will be held on a petition of the Common Council of New Britain and that of the city of Norwalk, both calling for reduced rates. The Common Council of Hartford has also taken up the matter of reduced fares, but it has been determined that the time is not yet opportune to ask for a general reduction. Factors which may enter prominently into the consideration of the fare matter at this time are the elimination of jitney competition by the State and the prospects for a reduction in the wages of the trainmen of the Connecticut Company in the arbitration proceedings recently brought to a close.

Syracuse Wants Fare Reduced

The city government of Syracuse, N. Y., will launch a new fight in November to reduce fares on the lines of the New York State Railways in Syracuse, Edmund H. Lewis, corporation counsel, has announced.

A demand will be made before the Public Service Commission that the 8-cent straight fare and the 7½-cent ticket fare be reduced to 5 cents. Mr. Lewis believes the New York State Railways cannot substantiate the needs of the present alleged exorbitant fares in order to provide a fair return on the value of its property.

Milo R. Maltbie, public utilities expert, will be retained by the city to aid in fighting the case.

Mr. Lewis is quoted as follows:

> We are planning to go before the commission early in November and endeavor to force a reduction in fares. The old Public Service Commission, which passed out of office soon after it made the fare award in the Syracuse rate case, provided in its order that the city could not appeal to the commission again until six months had expired.
>
> We never have felt that the present rates were fair, and we do not believe the value of the property used by the company entitles it to present fares. Traffic will increase with the approach of bad weather and we believe we will be in a better position to get all the facts fairly before the commission than at present. The present purpose is to file the complaint against the present rates the moment the six months' period expires.

The Public Service Commission has agreed to send one of its experts here to observe actual conditions. That investigation is scheduled to start within a few days.

Jitney Issue Before U. S. Court

Corporation Counsel Walter F. Meier of Seattle has gone to Washington, D. C., to represent the city in its last legal battle for the right to oust jitneys from competition with the Seattle (Wash.) Municipal Railway. The action before the United States Supreme Court will be in the nature of an application for an appeal to the court from the decision of the Supreme Court of the State of Washington, which recently vacated the injunction in the McGlothern case under which the jitney interests in Seattle were protected.

Should the application be granted, the jitney owners would have the right to appeal to the State Supreme Court for a continuance of that injunction, upon posting a proper bond, until the case should be argued before Justice McKenna, who is assigned to this circuit on the Federal Supreme Bench. The jitney interests will be represented in Washington by Representative Merrill Moores of Indianapolis.

Recently the city utilities committee of Seattle refused to grant permission to twenty-seven members of the Auto Drivers' Union to operate jitneys in Cowen Park district. This section is strictly residential and was built almost entirely on the strength of jitney service, and its residents are prepared to fight the removal of jitney service from the district. Property owners are preparing to organize for a vigorous compaign against the decision.

Another example of the city's objection to jitney competition is found in its filing with the State Department of Public Works a protest against buses to Seahurst and Three Tree Point in competition with the Lake Burien line of Municipal Street Railway.

More Five-Cent-Fare Lines

In announcing the plan of the trustees of the Boston (Mass.) Elevated Railway to extend the 5-cent no-transfer plan to seven additional sections of the company's system, Chairman James F. Jackson strongly intimated the purpose of the trustees to reduce the 10-cent basic fare unit. In a statement he said:

> An experiment of short-distance, local riding without transfer privilege for cheap fare has already been inaugurated in several localities. The first of these lines was opened in March in Everett and Malden; the second in May in Medford and Somerville; the third in June in East Boston; the fourth in August in Charlestown, North Cambridge, Belmont, Waverly and Watertown; the fifth in September in Dorchester and Roxbury. Last Saturday certain lines of this character were established in West Roxbury and one line between Allston and Dudley street via Brookline Village.
>
> The development of similar service affecting South Boston. Somerville, Cambridge, Brighton, Roxbury, Jamaica Plain and Brookline is now under study.
>
> It has been said and should be repeated that this cheap service is and must remain for at least many months purely as an experiment. If a reasonable test of it proves that either singly or collectively this limited service invades or seriously threatens the net revenue of the railway it will become necessary either to advance the local fare or to abandon the experiment. It cannot be continued if it materially interferes with or delays any otherwise possible reduction of the basic flat fare for travel throughout the system. On the other hand if it can be maintained without any injustice to those who pay the basic 10-cent fare, it is of great importance in increasing the usefulness of the railway.

Seven Cents in Toronto

Fares at present in force on the lines of the Toronto (Ont.) Railway as operated by the city are as follows:

Cash fare	7 cents
Tickets, 4 for	25 cents
16 for	$1.00
Book of 50 for	$3.00

Children in arms and children 51 in. in height or less, 4 cents cash, or seven tickets for 25 cents.

Night car fares ....15 cents each

It will be recalled that during the concluding days before the city took over the Toronto Railway on Sept. 1 Mayor Church insisted upon a continuation of the 5-cent fare, but the commission stood pat for the increase in fares and won out, as of course the commission has been clothed with the necessary authority to "run" the system. The idea of the commission was to fix a rate that would make the system self-sustaining from the start.

The changes in the fares has resulted in a large number of people who live just a few blocks away from the old Toronto Railway lines and who formerly walked, after leaving the Toronto Railway cars, now making use of the former Civic Railway lines on Danforth, Gerrard, Bloor, etc., as of course the one 7-cent fare entitles them to a transfer.

Bus Petition Rejected

Commission Refuses Request of Ultimate Bus Company to Operate in West Virginia

The State Road Commission of West Virginia, recently rejected the petition of the Ultimate Bus Company to operate in the State of West Virginia. The company has been operating buses between Wheeling, Martins Ferry, Bridgeport and Bellaire.

Several weeks ago following differences with the Wheeling Traction Company the bus company applied for a permit. At the hearing on Sept. 14 the traction company filed the only protest against the bus company. The bus company was prepared to file a brief in answer to the protest of the railway, but before the time for filing the brief had expired the State Road Commission rejected the petition and notified the bus company to that effect.

The Ultimate Bus Company started operation last spring and soon keen competition with the Wheeling Traction Company followed. No action was taken, however, until the new state road law, passed at the last session of the legislature became effective. The law prohibited the operation of buses until permits had been secured from the state road commission where the traffic is interstate. As a result of a subsequent hearing in Wheeling at which a representative of the state road commission was present no action was taken but all bus companies accepted immediately filed applications for permits.

In the meantime the Wheeling Traction Company sought an injunction in the circuit court to restrain the bus company from operating, but on the petition of the bus company the case was removed to the federal court where Federal Judge W. E. Baaker refused to grant the injunction. According to a statement made by the counsel for the Ultimate Bus Company the line will not suspend.

Fare Increase Postponed

The threatened raise of fares by the Community Traction Company, Toledo, Ohio, did not go into effect on Oct. 1. President Frank R. Coates rescinded the order upon the advice and statistical data furnished by Street Railway Commissioner Wilfred E. Cann.

The month of October will be a test month for the rival figures of the commissioner and statisticians for the company.

It is the commissioner's belief that riding will show a tendency to increase and that through economies and a decrease in expenditures for maintenance in winter months he will be able to show an increase in the stabilizing fund at the end of the month. The first year under the new grant expires on Feb. 1.

It had been proposed to increase ticket fares on Oct. 1 from the rate of six for 40 cents, or 6⅔ cents each, as against 6¼ cents each, but to continue the cash fare of 7 cents with 1 cent additional for each transfer.

Wants to Abolish Ticket Sales

Alleging that the Public Utility Commission of New Jersey erred in its estimate of the revenue returned when it handed down its decision in the New Jersey & Pennsylvania Traction Company's 10-cent fare case, early in July, the company on Sept. 20 appeared before the board asking permission to abolish the sale of tickets.

The board allowed an increase in the fare on the Princeton line from 7 to 8 cents in each zone or 7½ cents if tickets were purchased. The company now seeks to do away with the tickets, which are sold four for 30 cents. The board claimed that the new rate of fare would yield an annual revenue of approximately $124,960, or a net income of $29,500. The company claims these figures were made on a straight 8-cent fare.

Additional testimony was taken and decision reserved.

Auto Service Cuts Into Interurban Business

Jitney competition is credited by many with putting the Saginaw-Bay City Railway out of business, and since the Glaspie rate law went into effect about thirty touring cars have commenced operations between Saginaw and Flint, and Saginaw and Bay City. The heaviest travel is between the first-named cities. The fare charged by the Michigan Railway is $1.07. The touring cars carry passengers for $1 and the operators are actually soliciting patronage from the interurban waiting room when there is no policeman around.

Company officials are incensed at the high-handed manner in which this competition is being forced on them and assert that it is unfair. Most of the road between Flint and Saginaw is a concrete pavement for which the taxpayers paid $30,000 a mile. The railroad pays taxes and maintains its own right-of-way and the city governments allow those who happen to own touring cars to injure the company's business. Just what steps will be taken to combat the jitneys is unknown, but the police have been asked to stop the men from going into the waiting room and asking people to ride with them. There is not an officer present every time an interurban arrives or departs from the station, but steam roads are accorded protection, company officials point out, and say that more passengers arrive and depart from their waiting room than from any steam road passenger station in Saginaw.

During fair week the operators' committee representing the jitney men appealed to Mayor B. N. Mercer to stop touring cars from operating on the streets and depriving them of business. They asserted that the touring cars were without licenses. Previous to the complaint the Mayor appealed to every owner of a touring car, if on the way to the fair and room was available, to pick up passengers. Many took this to mean to operate without a license and charge for carrying passengers. The jitney owners received an absolute refusal to comply with their request, the Mayor asserting they started a competitive service when the street cars were running and he did not propose to stand in the way of others doing to the jitney bus owners what they had done to the railway.

With City's Help Five-Cent Fare Is Possible

The Indianapolis (Ind.) Street Railway will be able to maintain a basic 5-cent fare if the city eliminates the burden of paying the special franchise tax of $500,000 and relieves the company also of the cost of paving between tracks, Dr. Henry Jameson, chairman of the board of directors of the company, said following a recent meeting of the executive committee of the directors. The meeting was devoted largely to discussion of two ordinances introduced in the City Council which proposed a solution of the controversy between the city and company.

Directors of the company seemed satisfied that passage of the ordinance, which would prohibit jitneys receiving or discharging passengers on streets on which cars operate and which would require jitney drivers to file high bonds and conform to other stringent regulations, will stop loss of revenues, which company officers declare amount to $1,200 daily.

Dr. Jameson declared that railway officials will have no objection to passage of the other ordinance, which provides for continuing all provisions of the surrendered franchise not inconsistent with State laws and the power of the Public Service Commission, if it is practical and economical. While declining to comment outright on whether the company will contest payment of the franchise tax and paving costs in case the ordinance is passed, he declared that it will be better for the public if the company is relieved of these two burdens and asserted that eliminating these features would mean maintenance of the basic 5-cent fare.

Bus Plans Described

The City Commission of Manistee, Mich., recently heard the plan of operating a motor bus line in the city by a representative of the Duplex Sales Agency of Lansing, one of the bidders for the right to operate.

He described the type of bus which would satisfy the needs of Manistee and stressed the necessity for investigating thoroughly the transportation problem in the city before installing buses. In his talk he emphasized the importance of local capital in the enterprise.

Railway service in Manistee was abandoned on Sept. 1. Reference to this suspension was made in the ELECTRIC RAILWAY JOURNAL, issue of Sept. 10, page 416.

Transportation News Notes

One-Man Cars in Use.—The Binghamton (N. Y.) Railway is now operating one-man cars over its system with the exception of the Endicott and Union Street lines.

Extra Pay for Safety Runs.—The Muskogee (Okla.) Electric Traction Company has offered to motormen a cash bonus of $5 a month for each month they operate their cars without an accident.

Buses Prove Satisfactory.—The auxiliary bus service started on Humberside and Annette Avenues in West Toronto, Ont., has proved exceedingly popular with the citizens and is giving a five-minute service which is well patronized.

Arranging for Live Stock Shipment.—Plans for shipping live stock over the Interstate Public Service Company's lines between Indianapolis and Louisville, Ky., are being made and it is expected stock trains will be in operation on the lines by the new year.

May Use Trackless Trolleys.—The Transportation Commission has notified the Toronto Board of Control that it is prepared to operate motor bus or trackless trolley service in Toronto on Mount Pleasant Road as far north as Eglinton Avenue as a temporary means of relieving the traffic situation on North Yonge Street.

Will Consider Bus Line.—A hearing on the proposed bus franchise for Little Rock, Ark., was held recently by the public utilities and ordinance committees of the City Council. The Citizens' Bus Company is asking for the franchise for ten years. The chief reason for the service is to afford residents of the districts not served by railway lines an opportunity of reaching the downtown districts. The matter was deferred for further consideration.

Attractive Issue Out.—The story of electrical development in Chattanooga, Tenn., is told in an interesting article in the September number of *Electro Topics* entitled "Chattanooga — An Electrical Center," in which the author concludes by saying that there is no reason why Chattanooga should not become the electrical center of the South. Another interesting article in this number is "The Nature and Handling of Complaints." The expensive operation of automobiles is the subject of another instructive account. *Electro Topics* in this issue also tells what the railway property has done during the last few years in the way of reconstruction and improvement work. This little magazine, published by employees of the Chattanooga Railway & Light Company, should appear often instead of "every little while."

Personal Mention

New Duties for Mr. Fountain

H. A. Fountain was recently appointed secretary of the executive committee of both the Toledo Railways & Light Company and the Community Traction Company. But a few years ago Mr. Fountain was a motorman on the cars in Toledo.

Mr. Fountain started work for the Doherty Company in Joplin, Mo., as a draftsman during his college vacation. After graduation from the University of Missouri, he was a junior engineer from July, 1913, until July of the next year with the Denver Gas & Electric Company, also a Doherty property.

One year later he came to Toledo as a junior engineer, one of the first ten on that property. It was to have been his duty to make a survey of the traction problems, but the work was abandoned at the outbreak of the war and instead he went on the cars as an extra trainman. Today he admits that the experience he received in those days as a motorman is probably the most valuable he ever had.

From March, 1915, until July of this year he was in the New York office, at first compiling statistics of the Cities Service Company's earnings. Then he went into the operating department handling construction requisitions, later developing the construction and stock budget system, being in complete charge of this work. He also acted as secretary of the finance committee.

At Mr. Doherty's personal request he organized the bureau for the rating of investment securities and developed a procedure for the investigation and formulation of reports on industries, companies and securities, and directed the work of this bureau. On July 15 of this year he came to Toledo as director of the important budget system and also as secretary of the executive committee of both the Community Traction Company and the Toledo Railways & Light Company.

The public utility properties at Toledo under the management of the Doherty interests have recently been segregated so that the railway and the lighting systems are now entirely separate. This change was carried out under terms with the city calling for operation under service at cost.

Mr. Duffy Appointed to Detroit United Railway

C. Nesbitt Duffy, recently assistant to vice-president—accounting and finance—of the Philadelphia Rapid Transit Company, has been elected comptroller of the Detroit United Railway. Before his appointment to the Philadelphia Rapid Transit Company Mr. Duffy was for a long time in the Philippines first as vice-president and general manager of the Manila Electric Railway & Light Company and later as vice-president of the Visayan Refining Company. Previous to that he was connected for many years with the Milwaukee Electric Railway & Light Company.

Mr. Harvell Advanced

Light and Power Superintendent Named as Mr. Buchanan's Successor in Richmond

On almost the thirty-fourth anniversary of his career as a public utility man, John E. Harvell assumed his new duties on Oct. 1 as general manager of the Richmond-Petersburg division of the Virginia Railway & power Company, Richmond, Va., succeeding C. B. Buchanan, whose resignation was announced last week. In addition to his duties as general manager, Mr. Harvell will continue to have full charge of the company's light and power business throughout the entire system.

JOHN E. HARVELL

Mr. Harvell is a native of Petersburg and has acquired wide practical knowledge and experience both in the construction and operation of public utilities. He secured his first job on Sept. 13, 1887, as a lineman with the Upper Appomattox Company, one of the pioneer companies in harnessing water power for public service. In 1891 he was made assistant superintendent and three years later was promoted to superintendent of operations. When the interurban line between Richmond and Petersburg was put into operation in 1898 Mr. Harvell was placed in charge of the service but was relieved five years later in order to give his full time to the present hydraulic power development which was then being made on the Appomattox River.

When the Virginia Railway & Power Company was organized in 1909, Mr. Harvell continued in charge of the operations of the interurban and Petersburg city lines and was later, in addition, given supervision of the company's light and power properties at Weldon and Roanoke Rapids, N. C. In 1918 he was appointed general superintendent of light and power divisions of the entire system, including Richmond, Norfolk, Portsmouth and Suffolk, which duties he will continue to discharge in his new appointment.

During the war period when government activities and the increased populations of Richmond, Hopewell and Norfolk and vicinity were clamoring for more electric power Mr. Harvell was assigned to the mammoth undertaking decided upon by the company's directors of constructing the present high-power transmission line between Richmond and Norfolk, the then only possible means for providing the additional electric power requirements. The task was completed in remarkably short order and under most trying conditions. Recent construction work completed under Mr. Harvell's supervision includes a new substation at Hopewell and a transmission line between Petersburg and Hopewell for providing adequate power facilities for the new Hopewell which is arising out of the ruins of the old, and he is now engaged on the new project recently undertaken by the company of restoring an abandoned power plant and dam on the Appomattox River at Petersburg.

Mr. Harvell's experience extending over thirty-four years in construction work and also in the operation of railway, light and power service fits him admirably for the new post assigned to him in the company's organization.

Alva R. Dittrick, the only Cleveland city councilman to serve continuously on that body from 1910 when the Taylor service-at-cost grant went into effect, retired from that body to become a county commissioner this month. For six years Mr. Dittrick has been a member of the council street railway committee before which all legislature effecting the Cleveland (Ohio) Railway must pass. For the past two years he has been chairman of that body and as such will be succeeded by councilman Sam B. Michell.

Judge Julius M. Mayer of the United States District Court, whose nomination to the Circuit Court of Appeals was sent on Sept. 22 to the Senate by President Harding, will continue jurisdiction over the receiverships of the Brooklyn (N. Y.) Rapid Transit and the New York Railways Company. Judge Mayer was appointed to his present position by President Taft in February, 1912. Since that time he has handled many important cases, especially those involving traction. Apart from directing the affairs of the receiverships of the Brooklyn Rapid Transit and the New York Railways Company he has had the suits in equity against the Interborough Rapid Transit Company begun by the American Brake Shoe & Foundry Company placed before him. The suits have been before him on three different occasions on orders to show cause why a receiver should not be appointed, and each time he has granted an adjournment on the ground that a receivership should be avoided if possible.

Obituary

Thomas A. Wright

Thomas A. Wright, vice-president and general manager of the Wilkes-Barre (Pa.) Traction Company, died on Sept. 28, as the result of injuries received in an automobile accident. Mr. Wright was connected with the Traction System of Wyoming Valley for nearly thirty years. He was one of the organizers of the Wilkes-Barre Railway and since its organization in 1910 has been its chief executive officer.

All railway men will recall the controversy between Mr. Wright and the employees of the company that resulted in the strike called in the fall of 1915 and lasting for fourteen months. It was a case in which the events of the first few days turned from any attempt to settle the main issue to disorder and riot. The issue lay in the refusal of the trainmen to abide by an arbitrated decision. The controversy became so fierce at one time that it resulted in strike sympathizers making a personal attack on Mr. Wright. This spurred him on to an even greater determination to carry the fight to a successful finish for the company, and such was the outcome when the strikers accepted the decision handed down by the arbitrators in December, 1916.

Mr. Wright was born in Quakertown, Penn., Nov. 30, 1863. He was educated in the Quakertown public schools and subsequently pursued a course in the Wyoming Seminary, after which he turned his attention to civil engineering. Subsequently for several years he practiced engineering in Wilkes-Barre.

A few years later Mr. Wright began railroad work and assisted in the survey of the Harvey's Lake Branch Railway. In 1892 he entered upon the survey of the present trolley system of the Wyoming Valley and has been with the Wilkes-Barre Railway Company since. In 1897 he was made general manager of the maintenance of way department and two years later was appointed general superintendent of the entire system consisting of nearly 100 miles of track, all of which was surveyed, constructed and brought to its present high standard of excellence under his immediate direction.

He was named general manager of the Wilkes-Barre Railway Company in 1910 when local interests purchased the lease of the old Wyoming Valley Traction Company. Mr. Wright served for one term as president of the Pennsylvania Street Railway Association.

His son, T. A. Wright, Jr., has been identified for some time with the Wilkes-Barre Railway as auditor.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Stronger Copper Demand

Copper prices went up the early part of this week, and little if any October metal can be bought less than 12⅝ cents delivered. Rise in price is due to increased demand here and abroad. There is a feeling in the trade that the corner has been turned in copper, and that prices will be upward for some time to come.

Several important consumers are figuring upon orders covering business running late into 1922. This is the most encouraging aspect of the situation. Apparently the consumers have decided that it is useless to try to get one producer to fight another any longer by cutting prices drastically to get business. All have seemed to learn that when such tactics are followed the producers all suffer greatly while consumers in their turn lose through the price uncertainty which results.

Brass and wire orders are increasing with the demand unusually good for tubes and sheet copper and brass. Apparently copper prices, barring most untoward developments in Europe, are destined to rise slightly higher. However, it can be expected that the next rise of ½-cent a pound in price will take much longer to effect than the last. Most large producers are at present out of the market.

Price of electrolytic copper is 12⅝ cents a pound delivered for September domestic shipments, and 12⅝ for October and November combined. Price of Lake copper is 12⅝ to 12¾ cents a pound delivered for October and November.

Demand is strong from both wire and brass people with business for makers of sheets and tubes unusually good. Orders being placed by ultimate consumers with manufacturers are said to be widely scattered and inclined to moderate rather than large size in most instances.

Rectifiers for a French Railway

The increasing employment, says the London *Electrician*, of the mercury rectifier for railway work abroad is exemplified in a contract recently placed with the Sociétié Anonyme Brown, Boveri et Cie by the Chemins de Fer du Midi. This contract is for the complete equipment of five substations at Pau, Lourdes, Tarbes, Montrejeau and Lannemezan respectively with mercury are rectifiers.

The contract comprises in all sixteen 1,200-kw rectifier sets to operate on the direct-current side at the high pressure of 1,575 volts. Each set consists of a single main transformer supplying two high tension rectifiers in parallel. The primary supply will be three-phase at 60,000 volts, and a frequency of 50. Everything from the high tension to the direct-current side is included in the contract. The overload capacity for which the rectifiers are being designed is 50 per cent for two hours and 200 per cent for five minutes.

Messrs. Power Rectifiers, Ltd., who represent this end of Brown, Boveri's activities in England, say that the progress made during recent years with this class of plant is very marked, something like 160 individual equipments being either installed or in hand. They comprise roughly 340 separate rectifiers giving a total capacity of about 100,000 kw.

Railway Electrification in Madagascar

The governor general of Madagascar has decided to electrify the railroads of that colony from Tananarive to Tamatave, according to *Commerce Reports*. A hydro-electric power station will be built on the Vohitra river to furnish a maximum power of 30,000 hp. The length of the line is 93 miles and the total cost of the installations will reach $4,620,000. Assistant Trade Commissioner F. G. Singer, who furnished this information, states that the governor general is also considering the electrification of the future railroad from Diego-Suares to Joffre Ville, a road about 22 miles in length.

Waterpower Development in Japan Is Being Pushed Rapidly

Japan is pushing work on hydro-electric development as the demand for power in the larger cities as well as the smaller villages is far in excess of the supply available, according to Stephen Q. Hayes, a special electrical engineer of the Westinghouse Electric & Manufacturing Company, who recently returned from a six months' tour of Australia and Japan, where he made a special study of business conditions. Tokyo and Yokohama, near the eastern end of the main island, are supplied with power at 50 cycles from many hydro-electric plants and there is an electrified section of the railway between these two cities with multiple-unit trains every ten or fifteen minutes.

Near the middle of the main island, about 350 miles from Yokohama and Tokyo, are the large manufacturing cities of Kyoto, Osaka and Kobe. These are fed by numerous transmission systems operating at 60 cycles. Some of the most important hydro-electric generating stations are located about half way between the two groups of cities and some interesting problems are involved in making some of these stations suitable for feeding 50-cycle current to Tokyo and Yokohama and 60-cycle current to Kyoto, Osaka and Kobe.

Nine Electric Locomotives Exported During July

Of the nine electric locomotives exported from this country during July, eight, having a total value of $412,076, went to Brazil, says *Commerce Reports*, and one, invoiced at $11,100, went to England.

Bituminous Coal Output Falls

Production of bituminous coal in the United States during the week ended Sept. 3 was 7,571,000 tons, against 7,763,000 tons in the week previous, and 11,167,000 in the week ended Sept. 3, last year, according to the Geological Survey. For the calendar year to Sept. 3 the output was 264,647,000 tons, against 354,396,000 tons in the same time, last year.

Express Locomotives for Chile

Six express locomotives were also included in the order of the Chilean State Railroad from the Westinghouse Electric International Company. The other locomotive equipment to be furnished, as was announced last week, includes eleven local passenger and fifteen road freight locomotives and seven switching engines. All of these locomotives are of Baldwin-Westinghouse manufacture.

Will Study American Developments

It has been learned through government channels that R. Shirase, a Japanese government official and traffic manager of the railway department of the Formosan Government General, arrived in San Francisco on board the steamship *Taiyo Maru*, Sept. 9, 1921. His visit to the United States is for the purpose of studying the developments of the railroad situation in this country following the war. While Mr. Shirase is not a purchasing agent, it is understood that a considerable volume of railway material will be purchased later on, based upon his reports and recommendations. Mr. Shirase may be addressed in care of Mitsu & Company, 65 Broadway, New York.

Rolling Stock

Elmira Water, Light & Railroad Company, Elmira, N. Y., is intending within the next four weeks to place an order for three safety cars.

Los Angeles (Cal.) Railway will install 350 new motors on center-entrance cars. These are the largest cars operated by the railway. Westinghouse and General Electric equipment is being used. The total outlay will be about $350,000. The cars to be equipped are of the two-motor type.

New York, New Haven & Hartford Railroad has purchased from the International Motor Company three gasoline motor cars adapted for operation on rails by special trucks. They will have seating capacity of 35 and also a compartment for baggage. Delivery of these cars is expected early in December. They will be used in short-haul passenger service on branch lines.

Pacific Electric Railway, Los Angeles, Cal., has just placed in commission eleven rebuilt two-man side entrance, pay-as-you-enter, stepless cars. These cars will be operated on the Willowville-American Avenue line and the East Third street line. The cars represent modern design in local street car transportation and are considered almost accident proof. Work is being rushed on the new steel interurban cars assigned to the Long Beach route, which, as soon as completed, will be placed in service.

J. G. White Company, New York, has purchased for immediate delivery on account of the Manila Electric Company two "trollibuses" from the Atlas Truck Corporation, York, Pa. These machines are to be built according to the same design as those already built for operation in Richmond, Va., and on Staten Island, N. Y., with the exception that it is propelled by a single 45-hp. motor instead of a single 25-hp. railway motor in the case of those now operating in Richmond and two 25-hp. motors coupled in tandem as used on the Staten Island rail-less vehicles.

Track and Roadway

Ironwood & Bessemer Railway & Light Company, Ironwood, Mich., has extended its lines from Ayer Street south and east to Bonnie Street.

St. Thomas, Ont.—The electrification of the Canadian division of the Pere Marquette Railway is reported to be again under consideration.

Savannah (Ga.) Electric Company will extend its double tracks on Habersham Street from Anderson to Thirty-Seventh. Permission was recently granted by the city and work will start directly.

Public Service Railway, Newark, N. J., has notified the board of commissioners of Haddonfield, N. J., that it will furnish better trolley service, repair roadbeds and lay new tracks within the borough limits.

Toledo, Fostoria & Findlay Railway, Fostoria, Ohio, will lay new 60 lb. rails from the Baltimore & Ohio to the Lake Erie crossing. The rails will be slightly elevated in order that street re-surfacing will not be impeded in the future.

Toronto, Ont.—Mayor Church is urging the Transportation Commission to proceed with the construction of a double-track extension of the King Street car line from Sunnyside to the Humber. The Commission has decided not to construct the extension until next spring.

Northern Texas Traction Company, Fort Worth, Tex., has been granted authority by the City Commission in Fort Worth, Tex., to extend its University line three blocks from Elizabeth Boulevard to Cantey Street on South Adams Street. Work on the extension will begin at once.

Duluth (Minn.) Street Railway, has drawn up plans for a double-track extending 125 ft. from Tower Avenue along Twenty-first Street in the direction of Ogden Avenue. From this point the line will run on a single track for eleven blocks to Grand Avenue. The single-track plan has been approved by the City Council.

Frankford Elevated Railway. Philadelphia, Pa., may be extended 300 ft. north of Arch Street along Front Street to Market Street. Provision is also made for a temporary terminal as near Market Street as possible. The plans for the extension are nearly completed and bids will probably be asked for within the next three weeks.

Toronto (Can.) Transportation Commission, in connection with its reconstruction work will erect on the site of the Hillcrest site, carhouse and repair plant to serve the whole railway system. Property has also been acquired at Yonge & Eglinton Avenue for carhouses in North Toronto, and on the northwest corner of Eglington and Duplex Avenues a new substation similar to the one south of St. Clair Avenue is to be built.

Frankford, Tacony & Holmesburg Street Railway, Philadelphia, Pa., has placed within the last month with the Lorain Steel Company orders for six new spiral curves, section 114 No. 480 and 80 tons of 7-in. Trilby rail section 105 No. 484. In the spring of this year the company placed orders for 300 tons of rail section 105 No. 484 and about $14,000 worth of railroad crossings, new sidings and other special work with the Lorain Steel Company. Also 6,000 ties were ordered from Bernard Brothers. The railway does not expect to purchase further this year.

Trade Notes

Ohmer Fare Register Company, Dayton, Ohio, recently received a contract with the Georgia Railway & Electric Company, Atlanta, Ga., for equipping all of its cars with No. 3 type Ohmer registers.

E. E. Aldous has been appointed representative of the American Steel & Wire Company in St. Paul-Minneapolis-Duluth territory, with headquarters at St. Paul. Mr. Aldous has been connected with the company for twenty years in different positions.

Indianapolis Switch & Frog Company, Springfield, Ohio, announces a new line of rubber-covered flexible cables and cords for use with portable electrical equipment. A special cable has been designed for use with electric welders, grinders and all track tools. The outside coating, rubber-vulcanized under compression, resists abrasion, does not absorb water or liquid, is non-kinkable and of high tensile strength and extremely flexible.

Hunter Grubb has been made general manager in charge of paints of the du Pont Company, Wilmington, Del., following the company's resumption of its old plan of supervising its industries. Under the plan there will be a general manager in charge of each industry, while during the war supervision of the various industries of which the company is the owner was delegated to different members of the executive committee.

Carl F. Dietz, vice-president and sales manager of the Norton Company, Worcester, Mass., has resigned to become president and general manager of the Bridgeport (Conn.) Brass Company. He succeeds as president Fred J. Kingsbury of New Haven, who becomes chairman of the board of directors. Mr. Dietz has been connected with the Norton company for ten years, first as plant engineer, then as assistant sales manager, and afterward as sales manager of the wheel division of the business. Two years ago, when the Morton Company and the Norton Grinding Company were consolidated, he was made vice-president and sales manager.

New Advertising Literature

Insulators.—The Porcelain Insulator Corporation, Lima, N. Y., has issued a booklet, the purpose of which is to describe its pin-type insulators, manufactured for use on transmission lines operated at voltages from 6,600 to 70,000.

Battery Equipment.—S. R. Orum, 503-505 North Eleventh Street, Philadelphia, manufacturer of battery shop equipment, has issued a new catalog covering his products.

Safety Switches and Panel-Boards.—Catalog 12-A issued by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., includes new types of safety motor starters and safety panel-boards.

Track Reclamation.—Indianapolis Switch & Frog Company, Springfield, Ohio, has recently issued a booklet on the subject of track construction and reclamation by the arc welding process.

Electric Drill. — The Elecyto-Magnetic Tool Company, Chicago, has developed and placed on the market a ½-in. drill which may be used as a drill press by attaching to a portable stand.

Heavy-Duty Grinder. — The Van Dorn Electric Tool Company, Cleveland, has recently put on the market an improved heavy-duty ball-bearing electric grinder driven by a 4-hp. motor.

Edison Lamp Works, Harrison, N. J., part of the General Electric Company's system, has issued a series of pamphlets entitled "Lighting Data." Each booklet describes some phase of the lighting subject, one being on the proper system for lighting railway buildings and yards, another on lighting for outdoor sports, a third for lighting of printing plants, another a discussion of reflectors for incandescent lamps, etc.

Manganese Track Society and the Manganese Steel Founders' Society, Chicago, have issued in pamphlet form the specifications for switches, frogs, crossings and guard rails, as adopted for recommended practice by the American Railway Engineering Association at its annual convention in March, 1921. The pamphlet makes up a book of ten printed pages, printed on one side of the sheet only.

Why Peacock Brakes for Safety Cars?

Because—

if you don't have a hand brake which will really stop an *overloaded car* in an emergency, you may find the public authorities limiting safety car loads to seating capacity.

Because your motormen, in unreasoning opposition to the one man idea, may try to use the claim that they are not safe in an emergency. They will be compelled to admit their safety with Peacock Brakes.

Because the most powerful, most reliable, most economical hand brake for safety cars is the Peacock Staffless Brake.

You Needn't Experiment

It shouldn't be necessary for you to duplicate the experience of other managements which have experimented with inadequate hand brakes and have found them wanting.

Let us put you in touch with some properties where Peacock Staffless Brakes have become the adopted standard for safety cars as a result of wide experience with all kinds of brakes.

The Peacock Staffless

National Brake Company

890 Ellicott Square, Buffalo, N. Y.

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FARES, BUSES, MOTOR TRUCKS
More revenue from *more* riders
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Investigations · Tests · Recommendations
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Manufacturers of Steel Structures of all classes, particularly

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Specializing in Utility Rate Cases and Reports to Bankers and Investors
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Valuation and Rate Specialists
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THE P. EDWARD WISH SERVICE

50 Church St.
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DETECTIVES
Street Railway Inspection

131 State St.
BOSTON

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

Reduce Commutator Wear and Losses Due to "Tie-Ups"

To be absolutely safeguarded against excessive commutator wear—assured of real mileage day in and day out—and to obtain lower operating costs, use

National Carbon Brushes

the brushes that were made to suit the commutator and the service.

You name the job—we'll name the brush

National Carbon Company, Inc.
Cleveland, Ohio

A track like this
the repair shop.

DAYTON

leads straight to Boost it now.

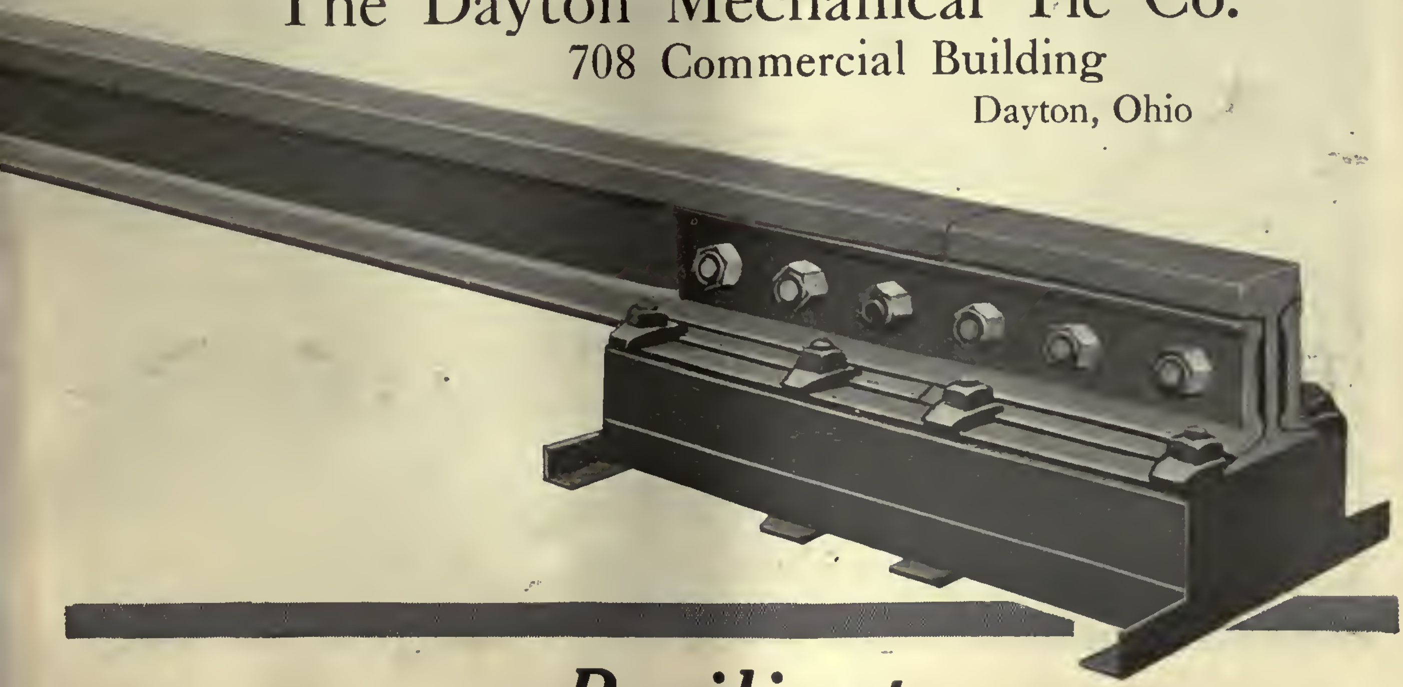
Look at this track! Broken and sagging rail joints—foundation rapidly crumbling away —paving all caved in—rolling stock being rapidly knocked to pieces.

You may think your cars as they pound over the track are headed for the terminal at the end of the line, but in reality they're making a bee-line straight for the repair shop—and they're taking the shortest possible route to get there.

Perhaps you can't afford to relay now but you know you can't afford to leave it alone. Shimming and other makeshift repairs are only a temporary relief. Why not put in Dayton Resilient Joint Boosters? They are permanent, economical and easy to install. They cost only $4.50 per joint and add years of life to your track, free from all further paving and track repairs.

Let us send you complete information and proven results.

The Dayton Mechanical Tie Co.
708 Commercial Building
Dayton, Ohio



Resilient
JOINT BOOSTER

In Planning Your Spring Trackwork

consider what

Differential Cars

will do toward speedy and economical completion of your program.

An investment in Differentials yields, during a busy track reconstruction season, a return equal to the investment.

Insure yourself as to delivery. Inquire now.

The Differential Steel Car Co., Findlay, Ohio

Indianapolis Economy Products That Make Dollars "Grow"

Indianapolis Solid Manganese—Frogs, Crossings, Mates and Tongue-switches. Super-quality material, Par-excellent designs. Gives many lives to one, of ordinary construction, and when worn down, CAN BE RESTORED, by INDIANAPOLIS WELDING.

Indianapolis Electric Welder—Efficient, Rapid, ECONOMICAL, Durable. Price $2.00 (per day for three hundred days), thoroly dependable every day in the year, upkeep about 75 cents per month. *Last a lifetime.*

Indianapolis Welding Steel—Fluxated heat treated Metal Electrodes, insure Uniform, Dependable Welds, that are from 75 per cent to 100 per cent more efficient, than the "MELT," from the same High Grade basic stock, untreated.

Indianapolis Welding Plates—Eliminate "Joints" and "Bonds" in Street Track. Higher in Strength and Conductivity than the unbroken Rail. Installed according to instructions, have proven THOROLY DEPENDABLE, during 10 YEARS, of "Time and Usage" TEST. Extensively used in 48 STATES and COUNTRIES. Recognized as paramount MAINTENANCE ELIMINATORS.

Indianapolis Welding Supplies—WELDING CABLES, Extra Flexible, "Rubber Tire-ed." WELDER'S Helmets, Hoods, Shields and Goggles. WELDING LENSES, Composite and Triplex, eye protectors. CARBONS, for Cutting and Burning purposes.

Electrical Supplies—Special, Flexible and EXTRA-FLEXIBLE, Conductors, Single, Two-way and Three-way, Cables and Cords. "RUBBER-TIRE-ED," Made like, Look like, Wear like, "A Rubber Tire." Made in all sizes for "SEVERE SERVICE."

Turntables—Ball-bearing, for ash-pits, storage yards, etc.

Indianapolis "Economy" Products are Pre-eminently "Money Savers", Yes "Money Makers" for Electric Railways

The Indianapolis Switch & Frog Co., Springfield, Ohio
J. C. Costello, Boston, Mass., New England Representative

TRADE MARK

Keeping the Rolling Stock Rolling

is largely a matter of having first-class equipment to work with. Keeping the rolling stock out on the line earning a profit instead of in the shops piling up repair charges, can best be accomplished by using the proper bearings and bearing metals.

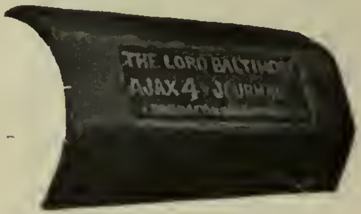
Forty years of specialization in bearings and bearing metals coupled with ideal production facilities have made Ajax Electric Railway products the safest—and cheapest-per-mile—on the market.

For his own protection every Master Mechanic should *specify*

Ajax Car Brasses
Ajax Check Plates
Ajax Motor and Axle Bearings
Ajax Armature Babbitt
Ajax Bull Bearing Alloy

Better than babbitt for lining brasses and axle bearings

Ajax Perfecto Check Plates will bend before they break.



The brass shown above ran for 15 years in actual service

THE AJAX METAL COMPANY

Established 1880

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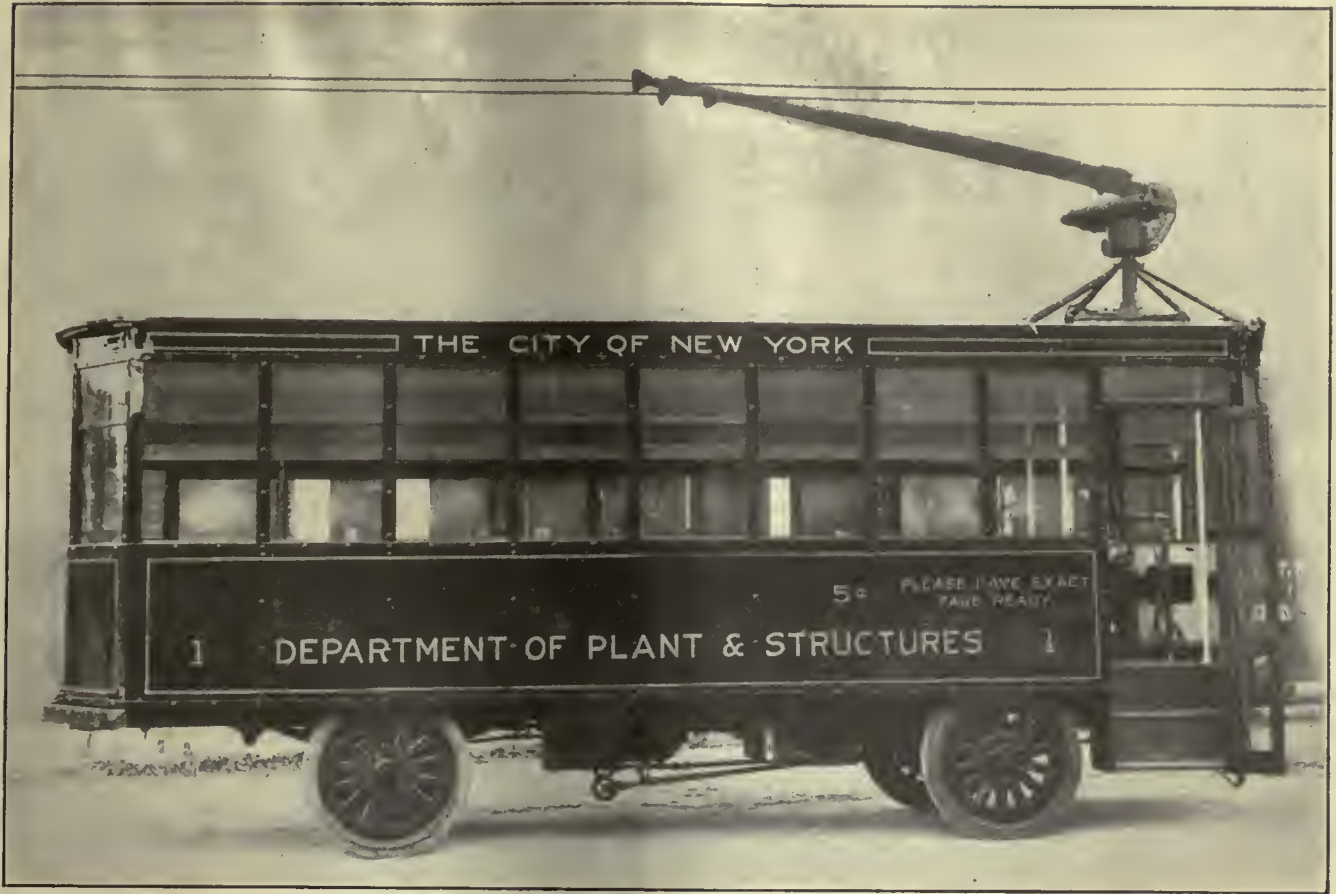
THE CITY OF NEW YORK
5¢
PLEASE HAVE EXACT FARE READY
1 DEPARTMENT OF PLANT & STRUCTURES 1

THE ATLAS TROLLIBUS

Eight on Staten Island—New York City

The aggressive and progressive transportation policy of New York City officials now includes the operation of trackless trolley lines. Eight fine vehicles like the one shown above have been built by us for operation in connection with the municipal service on Staten Island, one of New York's residential boroughs.

A public demonstration of the first bus is announced for Saturday, October 8, and regular operation on two new routes, hitherto unserved by transportation lines, will be started. These new routes are 2.6 and 4.4 miles in length. The overhead double trolley lines have been extended from existing municipal railway lines.

These trackless cars are designed for one-man operation, seating 30 passengers, and have a 24-inch aisle accommodating ten standing passengers.

Driven by two 25 H.P. railway type electric motors — foot-operated, dead-man switch—7 point rheostat controller.

Steel construction—frame of structural steel shapes, body covering of steelasote.

Send in your inquiry now.

THE ATLAS TRUCK CORPORATION

York, Pa.

Insurance plus
Marsh & McLennan Service

May we tell you more what insurance, plus Marsh and McLennan service, means to the business executive who would safeguard his profits, eliminate hazards and reduce his insurance cost?

MARSH & McLENNAN

175 W. Jackson Blvd. Chicago, Ill.

Minneapolis
New York
Detroit
Denver

Duluth
Columbus
San Francisco
Seattle

Cleveland
Winnipeg
Montreal
London

PASSENGERS on this car
will please change to--
REIS UNION SUITS

GUARANTEED UNDERWEAR
REIS

Robt Reis & Co. N.Y.

A SIGN OF THE TIME

Knee length for Summer; long ones for Winter

What Kipling says of the rifle, "she's as human as you are, treat her as such," applies equally to any machinery—the trolley car.

So now is the time to change to Winter Oil.

Change to

TEXACO WINTER ELECTRIC CAR OIL.
TEXACO WINTER AIR COMPRESSOR OIL.
TEXACO WINTER GEAR LUBRICANT.

These oils are carefully prepared to give the most efficient lubrication, as they take into account the seasonal difference in temperature. That is, the Winter Oils are of slightly lower viscosity. As is well known, all oils tend to run a little thicker under exposure to cold, and thus these Texaco Winter Lubricants have the same viscosity under working temperature conditions as do our Summer grades.

These oils are Texaco Lubricants, which means all are carefully refined, thoroughly tested for the work and guaranteed by one of the world's largest refiners of Petroleum Products.

Ask us to give you some interesting facts on the lubrication of rolling stock, power plant, shop—anything connected with street railway lubrication.

Remember: there is a Texaco Lubricant for every purpose.

TEXACO T REG. U.S. PAT. OFF.

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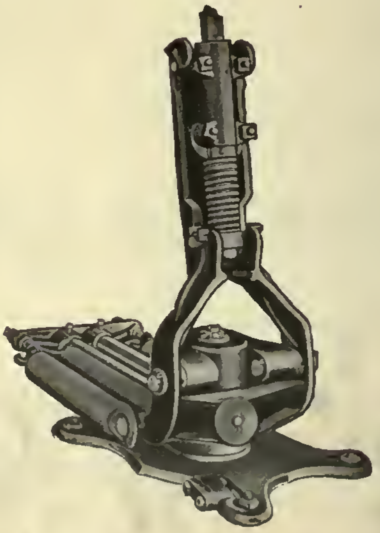


Increase Your Transportation Sales

By Increasing the Efficiency of Your Service

Keep Your Cars Always on Time by Using Bayonet Trolley Equipment

Bayonet Special Trolley Wheels

are made of the very highest grade of metal. No cheap alloys or old trolley wheels recast into new ones. All hand turned, insuring the greatest accuracy and balance. They are known all over the world for their superiority over other wheels, their economical and efficient service having been proved by competitive tests.

Bayonet Detachable Trolley Harps

are the only trolley harps with which you can change from wheel to sleet cutter or to a new wheel in TEN SECONDS. No tools required on top of the car; only your hand is necessary. All inspections, repairs, adjustments and lubricating are done at the work bench where they are better done. This eliminates unsatisfactory patchwork on top of car, insures perfect running trolleys and increases your trolley wheel mileage at least 33⅓%. The original and only practical Non-Arcing Harp made.

Bayonet Trolley Base with Detachable Pole Clamp

is the only trolley base made on which the trolley pole can be changed in 30 SECONDS and the wheel be in perfect alignment with the wire, and no tools required to do the job. Greatest flexibility of pole action is afforded by long extension springs and self-lubricated bushings in bearings, and the roller bearing swivel gives freedom to the rotary motion. It is so constructed that you get a uniform wire pressure at all angles of pole. All wearing parts are quickly and cheaply renewed, making the main parts of the base everlasting.

Perfect conductivity is afforded by sliding contact between turret and base plate. It saves your overhead, your wheels and your wire by its freedom of action.

Bayonet Sleet Cutters

have no superiors in cutting ice from the wire. If the ice can be removed the Bayonet will do the job. We have the rigid and semi-rotary types (the kind you can back up with) both of which are detachable and interchangeable with the wheel. Only ten seconds necessary to make the change from harp with wheel to one with sleet cutter.

All Bayonet equipment sold subject to approval. You must be satisfied or your money will be refunded. Begin now to practice economy by using the Bayonet.

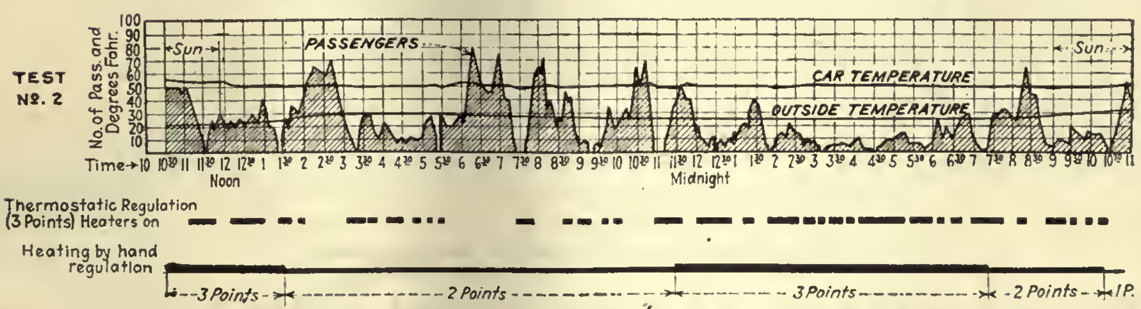
BAYONET TROLLEY HARP CO.
Springfield, Ohio, U. S. A.

UTILITY

Saving 35%

A TEST on the Third Avenue Railway, New York, which was reported in Electric Railway Journal of June 19, 1920, showed a power saving of a little better than 35 per cent due to regulation of car heating by the Utility Thermometer Control.

The chart at the bottom of this page shows the outside temperature ranging from 22 to 32 degrees, the inside temperature constant at 50 degrees. Hand regulation, shown by the bottom line, is arranged for three intensities of heat, and was plotted more accurately than would be possible in actual service. Actual consumption under Utility regulation was 87.84 kw. hours and the calculated consumption under proper hand regulation would have been 135.7 kw. hours, showing a saving of 35.26 per cent due to Utility Thermometer Control.



TEMPERATURE TEST NO. 2, USING THERMOSTATIC CONTROL

Railway Utility Co.

Chicago: 141-151 W. 22d St.

J. H. Denton, Eastern Mgr., 1328 Broadway, New York
F. S. McNamara, 209 Barth Bldg., Denver
O. W. Meissner, 10 St. Antoine St., Montreal
F. O. Grayson, 600 La Salle Bldg., St. Louis

—where are the handles for this car?

"Time to pull out—let's go!"

"Oh, Bill! No handles on this car!"

How often are your cars late in getting out because of misplaced controller and air brake handles—someone has borrowed them during the night to move another car and has forgotten to return them.

Controller — Reversing — Airbrake HANDLES

When you need additional handles, let us quote on them. We have large stocks in bronze and malleable iron, or can cast them to your own specifications.

Shop Service for Electric Railways

Handles are only one item on the large list of articles we are ready to furnish from our big shop, devoted almost exclusively to electric railway supplies.
Note the partial list below, and write us for quotations on any special castings, forgings or machine work you may need.

Armature Coils—Motor Parts—Controller Parts
Brake Parts—Gear Cases—Truck Parts
Trolley Poles—Wheels—Line Material

The Columbia Machine Works and Malleable Iron Co.

Atlantic Ave. and Chestnut St., Brooklyn, N. Y.

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E. Allison Thornwell,
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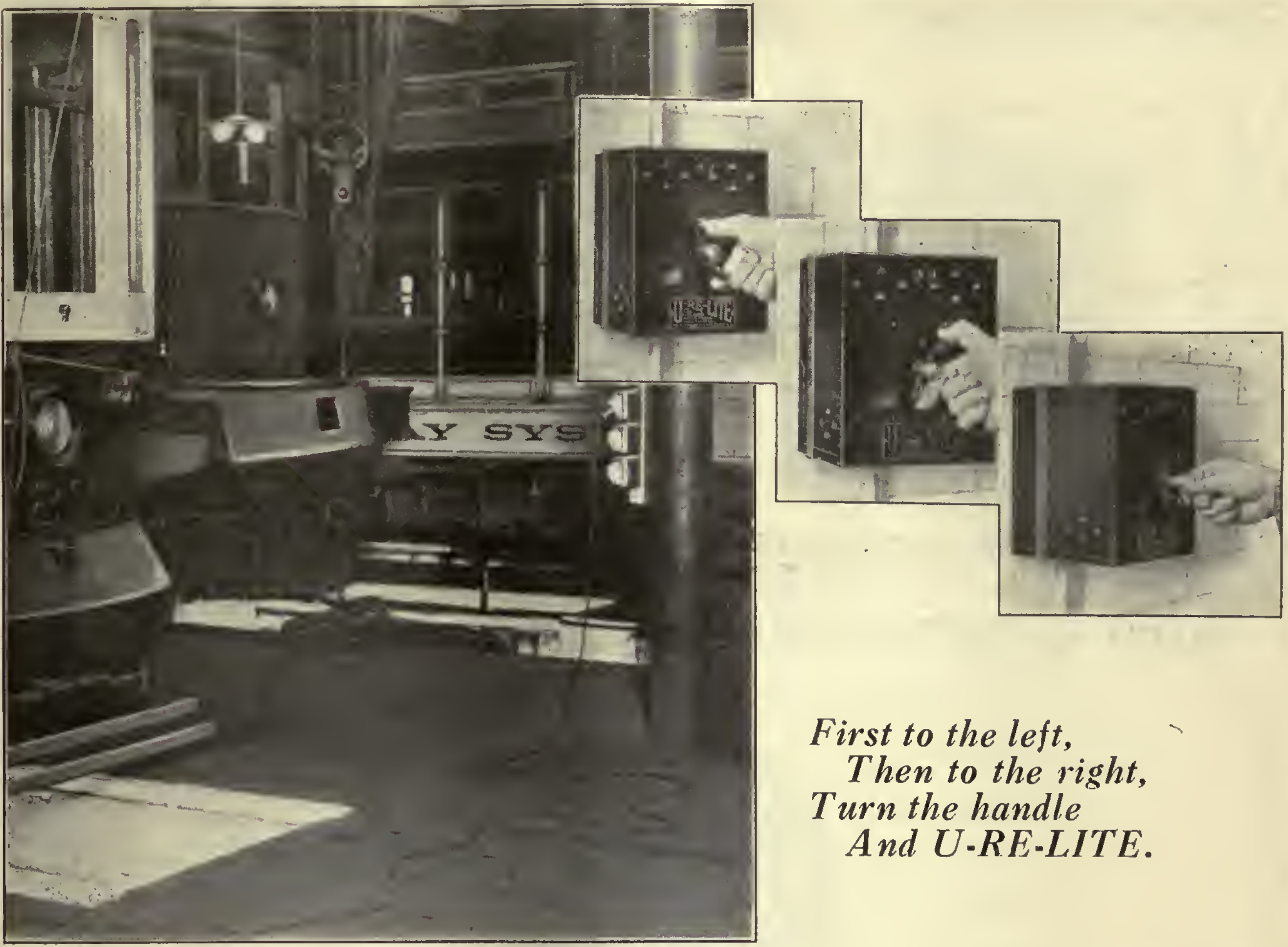
W. McK. White,
343 South Dearborn Street,
Chicago, Ill.

F. F. Bodler,
903 Monadnock Bldg.,
San Francisco, Cal.

Railway & Power Eng. Corporation, 133 Eastern Ave., Toronto, Ont.



First to the left,
Then to the right,
Turn the handle
And U-RE-LITE.

U-RE-LITE

where circuits may be overloaded

In the shops and 'round the pits, where all kinds of motor-driven portable tools and lights are being plugged into every convenient socket, there's many a delay due to blown fuses which could be prevented by U-re-lite installations. Have you noticed how much your fuse bills amount to? Not to mention the cost of delays and production losses.

The U-re-lite is a switch and circuit-breaker combined, eliminating troublesome fuses —a money-saver and a time-saver for every shop. When an overload or "short" occurs, the U-re-lite opens the circuit instantly. A turn of the wrist is all that's needed to close it again.

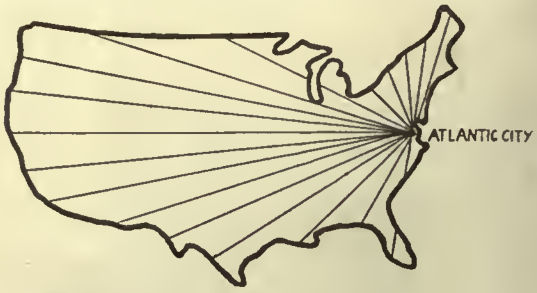
Cuts fuse expense 100% and eliminates delays.

Made in various sizes and capacities up to 200 amperes for A.C. and D.C. circuits. Adjustable over a wide range above and below normal rating, as shown on the name-plate.

if it isn't
an I-T-E
it isn't a
U-RE-LITE

Time is lost by Fuses blowing—
U-RE-LITE will keep things going!

THE CUTTER COMPANY
Established in 1888
Philadelphia, Pa



Here We Are!

Here are our Convention exhibits. Though we could not display the actual equipment itself at this year's meeting, we want to send you a sample to examine and try out yourself.

EARLL
Trolley Catchers and Retrievers

For Safety Cars

For City Cars

For Interurban Cars

FOUR FEATURES EARLL EXCLUSIVELY

1. **Ratchet Wind**
2. **Emergency Release**
3. **Drum Check**
4. **Free Winding Tension Spring**

These valuable mechanical improvements peculiar to the Earll, are combined with a simplicity and ruggedness of construction which makes this the most satisfactory and economical Retriever to use.

C. I. EARLL, YORK, PA.

Exhibit of the Midvale Steel and Ordnance Company and Cambria Steel Company at the 1920 Convention of the A. E. R. A., Atlantic City

WITH the passing of the annual convention of the A. E. R. A. we can't help looking back over the many years during which we have participated and exhibited at these meetings. While it was impossible for us to extend an invitation to visit at our own space this time, it was a great pleasure to renew many old acquaintances and make new ones through those of our representatives that were present.

Don't forget that we are still making rolled steel wheels, axles, rolled and forged gear blanks, and many other products used in electric railway service and maintaining the same high standards that have established firmly the reputation of Midvale and Cambria specialties.

MIDVALE STEEL AND ORDNANCE COMPANY
CAMBRIA STEEL COMPANY

Atlanta
Boston
Chicago
Cincinnati
Cleveland
Detroit
New York

General Offices:
Widener Building Philadelphia, Pa.

Philadelphia
Pittsburgh
San Francisco
Salt Lake City
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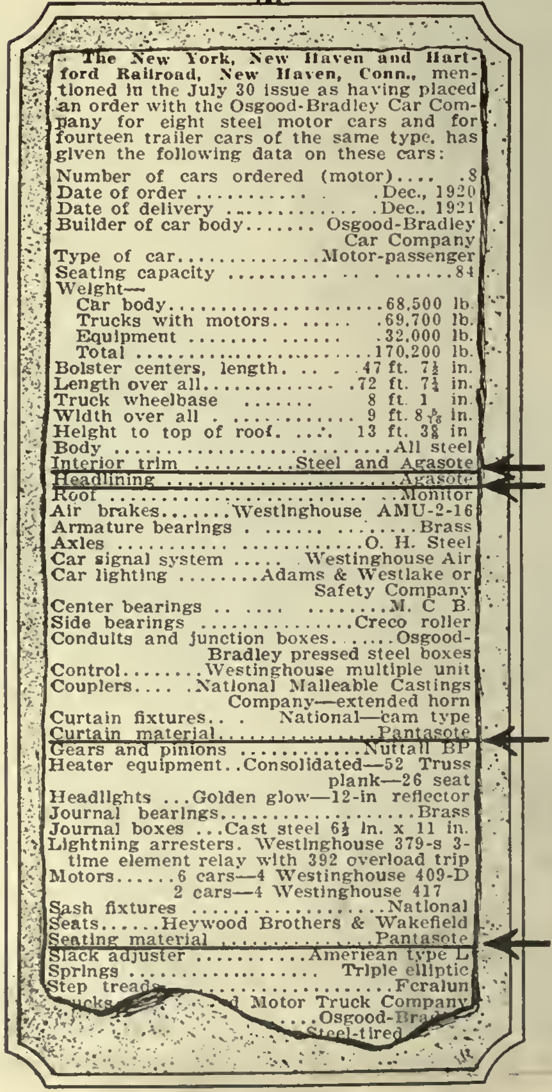
SOLE EXPORTER OF OUR COMMERCIAL PRODUCTS CONSTECO CONSOLIDATED STEEL CORPORATION 25 BROADWAY, NEW YORK, U.S.A.

New York New Haven and Hartford RAILROAD



The New York, New Haven and Hartford Railroad, New Haven, Conn., mentioned in the July 30 issue as having placed an order with the Osgood-Bradley Car Company for eight steel motor cars and for fourteen trailer cars of the same type, has given the following data on these cars:

Number of cars ordered (motor)	8
Date of order	Dec., 1920
Date of delivery	Dec., 1921
Builder of car body	Osgood-Bradley Car Company
Type of car	Motor-passenger
Seating capacity	84
Weight—	
Car body	68,500 lb.
Trucks with motors	69,700 lb.
Equipment	32,000 lb.
Total	170,200 lb.
Bolster centers, length	47 ft. 7½ in.
Length over all	72 ft. 7¼ in.
Truck wheelbase	8 ft. 1 in.
Width over all	9 ft. 8 5/16 in.
Height to top of roof	13 ft. 3⅜ in
Body	All steel
Interior trim	Steel and Agasote
Headlining	Agasote
Roof	Monitor
Air brakes	Westinghouse AMU-2-16
Armature bearings	Brass
Axles	O. H. Steel
Car signal system	Westinghouse Air
Car lighting	Adams & Westlake or Safety Company
Center bearings	M. C. B.
Side bearings	Creco roller
Conduits and junction boxes	Osgood-Bradley pressed steel boxes
Control	Westinghouse multiple unit
Couplers	National Malleable Castings Company—extended horn
Curtain fixtures	National—cam type
Curtain material	Pantasote
Gears and pinions	Nuttall BP
Heater equipment	Consolidated—52 Truss plank—26 seat
Headlights	Golden glow—12-in reflector
Journal bearings	Brass
Journal boxes	Cast steel 6½ in. x 11 in.
Lightning arresters	Westinghouse 379-s 3-time element relay with 392 overload trip
Motors	6 cars—4 Westinghouse 409-D 2 cars—4 Westinghouse 417
Sash fixtures	National
Seats	Heywood Brothers & Wakefield
Seating material	Pantasote
Slack adjuster	American type L
Springs	Triple elliptic
Step treads	Feralun
ucks	d Motor Truck Company
	Osgood-Brad
	Steel-tired

The New York, New Haven & Hartford Railroad Company, for its new electric cars, specifies both

AGASOTE
(Trade Mark)
and
PANTASOTE
(Trade Mark)

Agasote roofing requires no overcoating of canvas to waterproof it. It comes in sheets cut to dimension and shaped to curvature required, saving expense in installation.

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Pantasote curtains and upholstery—for over a decade the first choice among the leading electric and steam railroad properties.

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Our Advertisements
1889-1921

THE STREET RAILWAY JOURNAL.

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Best Materials and Workmanship Guaranteed.

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The three strong points in our 1889 advertising are true today, as they were then. Our plant and equipment is as complete, modern and efficient as any in the country. We always have patterns of the latest and most improved designs, notably our Quality Safety Cars and Trackless Trolleys. And the claim, "Best Materials and Workmanship," then a statement supported only by our own word, is now the established reputation of St. Louis Quality Cars.

St. Louis Car Company
St. Louis, Mo.
"The Birthplace of the Safety Car."

"STANDARD"

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Steel Tired Wheels

Solid Rolled Steel Wheels

O. H. Steel and Malleable Iron Castings

Solid Forged Gear Blanks

Steel Forgings Iron Forgings

Forged and Rolled Steel

Pipe Flanges

Ring Dies

Rings

Roll Shells Steel Springs

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"The 'Standard' Brand on your material is an assurance of eventual economy."

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HAVANA, CUBA
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No. of Mill
M A

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REPLACEMENT
ECONOMY

IT'S THE CONSTANT "LITTLE REPAIRS" THAT BUILD UP EXCESSIVE MAINTENANCE COSTS.

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Of course you can never get away from *all* of this sort of expense, but you can eliminate a surprisingly heavy proportion of it by using

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"THE WOOD ETERNAL"

not only on new construction, but on all replacement work.

All-heart Cypress comes nearest

to being "decay proof" of any lumber in the market suitable for railway use.

Several of the largest railway companies in the country have found the use of Cypress a paying investment.

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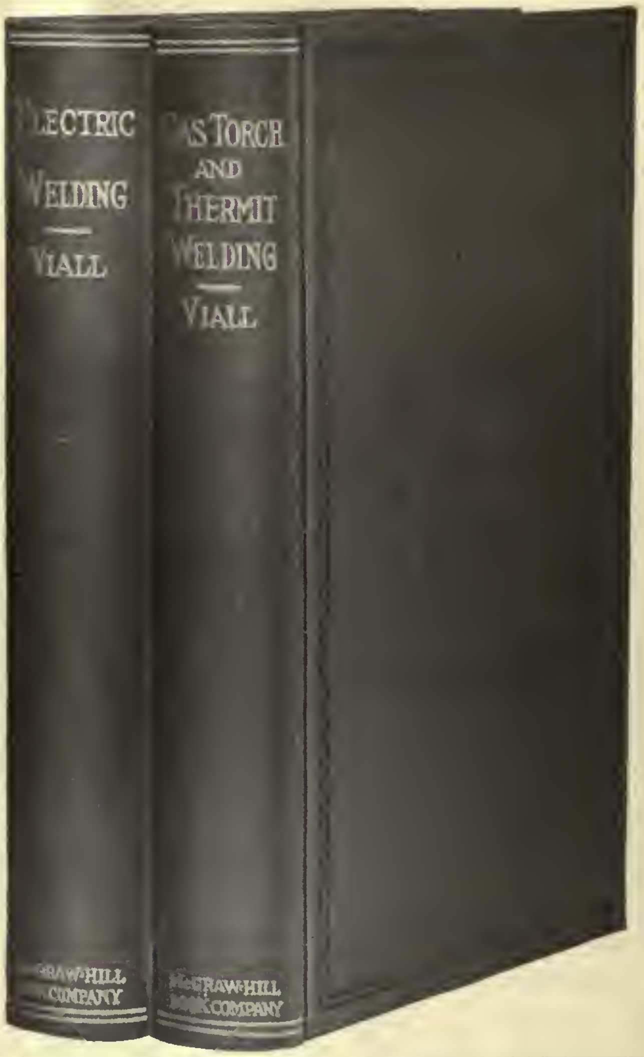

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Gas Torch and Thermit Welding

These books give exact working formulas and tables, show step by step how actually to do the work and give details of all the principal makes of apparatus and equipment.
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See the Searchlight Section in this issue.

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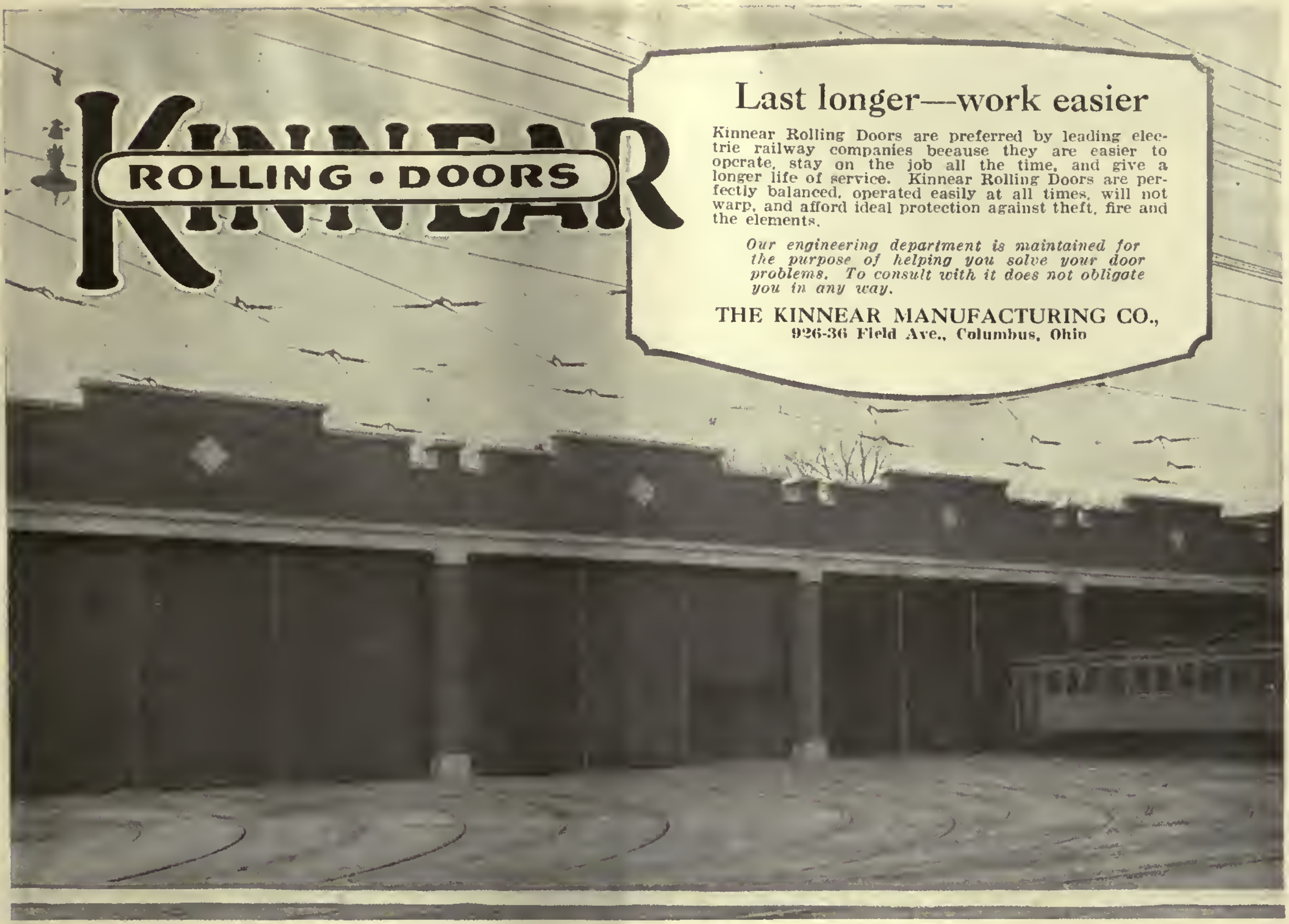

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Last longer—work easier

Kinnear Rolling Doors are preferred by leading electric railway companies because they are easier to operate, stay on the job all the time, and give a longer life of service. Kinnear Rolling Doors are perfectly balanced, operated easily at all times, will not warp, and afford ideal protection against theft, fire and the elements.

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are the BEST for One Man Safety Cars

Specially designed for this service

Lightest Weight Stationary Steel Seat

Lightest
Strongest
Simplest
Neatest

Lightest Weight Walkover Steel Seat

Yet no higher in price than others

Specify H&K Seats for Your New Cars

Hale & Kilburn Corporation
American Motor Body Company, *Successors*
PHILADELPHIA

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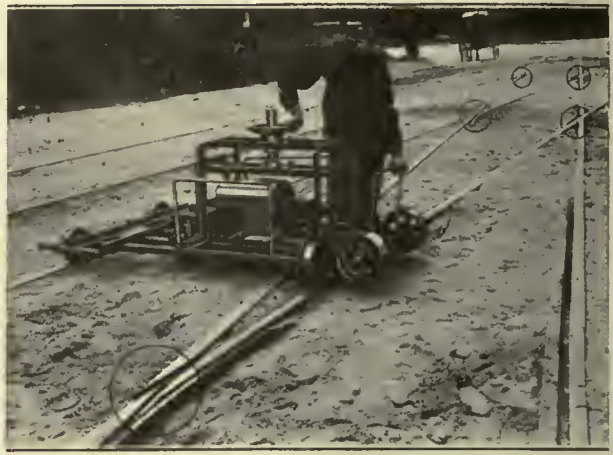

Five frogs (count them)
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Portable Rail Grinder

This is the story of what the MIDGET actually accomplished for one large Eastern property recently. The Roadmaster had received instructions to do a piece of work requiring a layout of five frogs to be made on the ground. It was a rush job—six days time limit. Impossible? It looked so at first, but the efficiency and rapidity of the MIDGET, its ability to get into, and grind the grooves in short order, permitted the stunt to be finished on time, to the delight of the Roadmaster.

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Engineers Valves for Air Brakes

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Whether for high speed passenger cars or slow freights, from the heaviest steam railroad service to the little Birney safeties on the street railways, Weierbach Brake Shoes will show 25% to 50% longer life than the ordinary shoe, and will afford greater safety and smoothness of operation. Write for quotations.

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Comes in strips cut to specification and ready to be inserted in slots.

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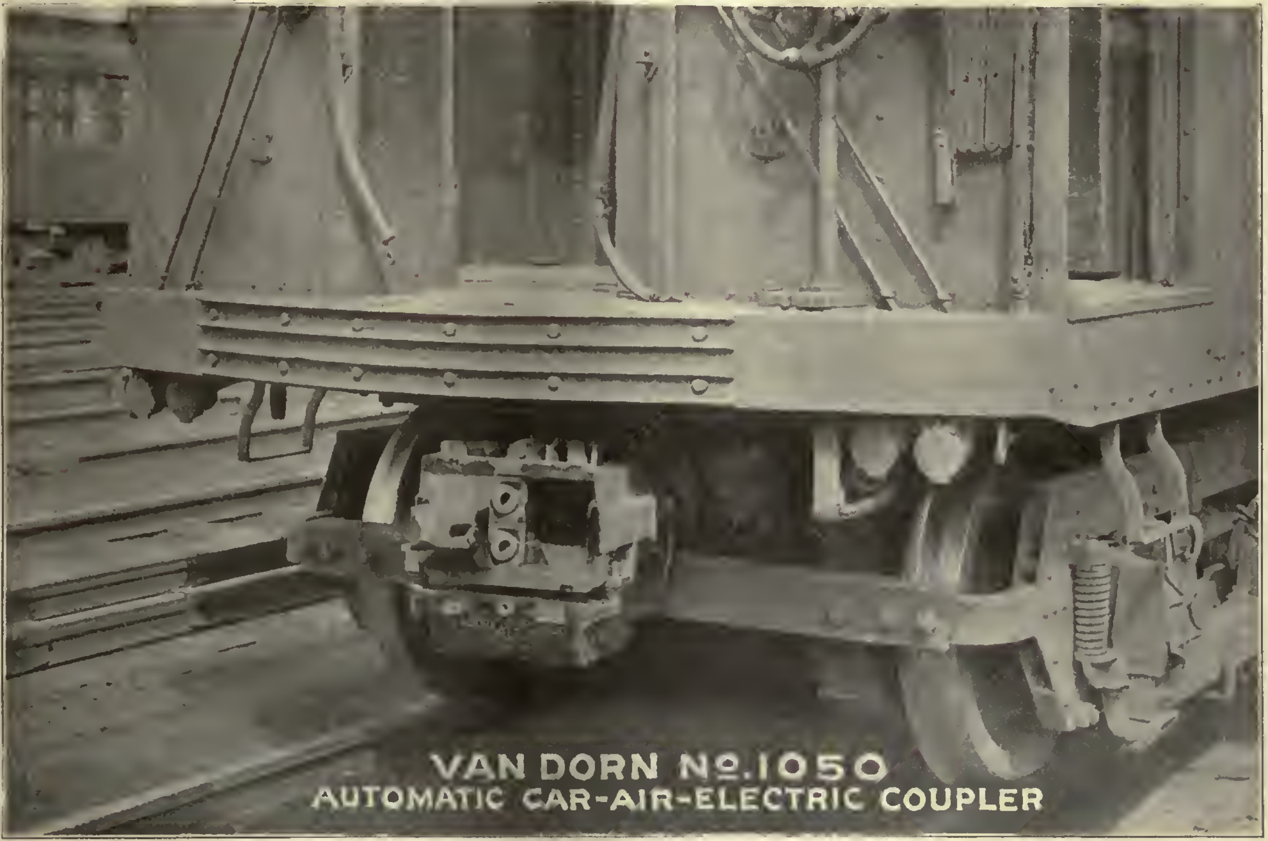

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SLACK in the brakes shortens brake-shoe life. Brake shoes are costly and car-house labor even more so. Inspections and upkeep require too large a force on most railways. Safety and revenue mileage cannot be increased where brake shoes are improperly set with resulting slow rates of braking and poor stops. Railway executives must face these facts squarely.

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S-W brake slack adjusters eliminate the old-time night inspections, waste of air because shoes are always at the correct distance from the wheel, and unnecessary strains on the brake rigging.

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ECONOMY in buying wheels does not permit consideration of cost alone, but rather, strength, durability and safety. Carnegie Steel Wheels are economical because they possess to the highest possible degree, these desirable features.

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While costing originally more than cast wheels, Carnegie Steel Wheels show an ultimate saving, their life being from four to five times as great.

For economy specify Carnegie Steel Wheels

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DURSON
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—more than a slack adjuster

An apparatus for the automatic, positive and accurate adjustment of brake rigging and the limitation of piston travel. The only slack adjuster on the market which functions during the application of the brake. Controls the length of piston travel, instead of being controlled by it.

Provides for a fixed brake shoe clearance.
Can be used on any type of car.
It forms a positive member in compression in the brake rigging. Extension to compensate for slack by means of a screw thread. Cannot slip—absolute safety obtained at all times.

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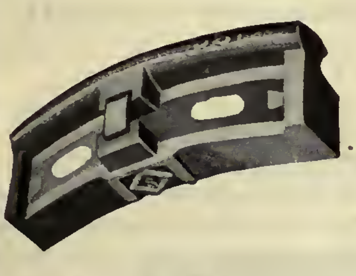

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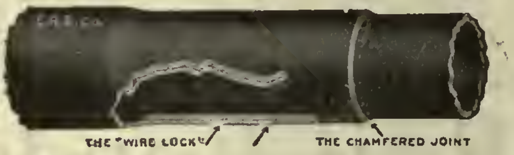

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Your best insurance against insulator breakage
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Automatic Safety and Automatic Return Switch Stands for Passing Sidings. Tee Rail Special Work for Interurban Lines and Private Rights of Way Manganese Construction a Specialty.

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The fields of usefulness for Bakelite-Dilecto are many and varied because of its superior merit over materials heretofore available in sheets, tubes or rods. The exceptional qualities of Bakelite-Dilecto are satisfying electric railways all over the country. Investigate.

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A Chain Hoist that excels in every feature. It has Planetary Gears, Steel Parts, 3½ to 1 factor of Safety. It's the only Block that carries a five-year guarantee.

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For Driving Your Auxiliaries
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WE-FU-GO AND SCAIFE
WATER
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SOFTENING & FILTRATION
FOR BOILER FEED AND
ALL INDUSTRIAL USES
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A necessity for turbine protection, engine cylinder economy and utilization of superheat for all its benefits
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Charleston, W. Va., 110 Hale St.
Birmingham, 510-512 Brown-Marx Bldg.
St. Louis, 401 National Bank of Commerce Bldg.

Belden
MAGNET WIRE
Silkenamel Cotenamel
Beldenamel

We draw, roll and insulate square, rectangular and round Magnet Wire in all sizes.

Standard sizes and insulations can be shipped promptly. Special rectangular cross sections can be manufactured in as small as 200 pound lots.

Our facilities and location enable us to extend a service particularly interesting to the repair shop foreman.

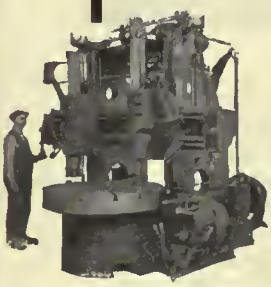
BELDEN MANUFACTURING COMPANY
Electrical wire, cable and cordage

Main Office and Factory
Chicago, Ill.

Eastern Warehouse
Metuchen, N. J.

ELECTRICAL CONDUITS AND FITTINGS
— WRITE FOR BULLETINS —
National Metal Molding Co.
PITTSBURGH, PA.

NILES-BEMENT-POND CO.
111 BROADWAY, NEW YORK



MACHINE TOOLS
FOR ELECTRIC RAILWAYS

- Axle Lathes
- Wheel Presses
- Car Wheel Lathes
- Boring Mills
- Lathes
- Hammers
- Cranes
- General Machine Tools

Heating and Ventilating

Let us demonstrate to you how we can heat and ventilate your cars at the lowest possible cost.

The Cooper Heater Company
Carlisle, Pa.

HORNE MANUFACTURING CO.
Mercer and Colgate Streets, Jersey City, N. J.

Hand Brakes—Air Purifiers for Compressors—Lighting Fixtures—Electric Vibrating Bells—Thermostats—Switches, Receptacles and Plugs—Junction Boxes, Portables and Reflectors.

J. H. WILLIAMS & CO.
"THE WRENCH PEOPLE"
Brooklyn · Buffalo · Chicago

HACKSAW
HIGH SPEED
GLADIUM
ECONOMY
EFFICIENCY
BLADES
GLADIUM CO. Inc. 34 Cliff St. New York

A Single Segment or a Complete Commutator

is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.

Cameron Electrical Mfg. Co., Ansonia, Connecticut

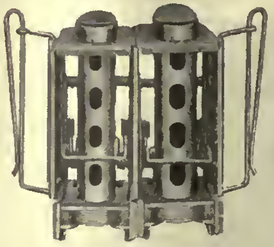
COMSTOCK

Coil Press

Write us for information and prices on Comstock coil presses, forming and winding machines. Forms for field and armature coils of most types of railway motors, already in stock.

The Comstock Manufacturing Co.
319 Horton Street, Wilkes-Barre, Pa.

JOHNSON Universal Changer



Adjustable

The only changer on the market which can be adjusted by the conductor to throw out a varying number of coins, necessary to meet changes in rates of fares.

Flexible

Each barrel a separate unit, permitting the conductor to interchange the barrels, to suit his personal requirements and to facilitate the addition of extra barrels.

JOHNSON FARE BOX COMPANY
Ravenswood, Chicago, Ill.

Type R-10

International Registers

Made in various types and sizes to meet the requirements of service on street and city system.

Complete line of registers, counters and car fittings.

Exclusive selling agents for HEEREN ENAMEL BADGES.

The International Register Co.
15 South Throop Street, Chicago, Illinois

Waterproofed Trolley Cord

Is the finest cord that science and skill can produce. Its wearing qualities are unsurpassed.

FOR POSITIVE SATISFACTION ORDER
SILVER LAKE

If you are not familiar with the quality you will be surprised at its ENDURANCE and ECONOMY

Sold by Net Weights and Full Lengths

SILVER LAKE COMPANY
Manufacturers of bell, signal and other cords.
Newtonville, Massachusetts

Car Seating, Broom and Snow Sweeper Rattan, Mouldings, etc.

AMERICAN RATTAN & REED MFG. CO.
Brooklyn, N. Y.

AMERICAN means QUALITY
RATTAN SUPPLIES OF EVERY DESCRIPTION

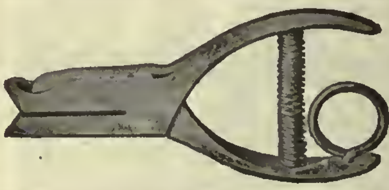
ELECTRIC HEATER EQUIPMENTS

GOLD CAR HEATING & LIGHTING CO.
NEW YORK CITY
PATENTED

THERMOSTAT CONTROL EQUIPMENTS

Address All Communications to
BUSH TERMINAL
(220 36th St.)
Brooklyn, N. Y.

Literature on Request



Economical in the Long Run

BONNEY-VEHSLAGE TOOL CO.
Newark, N. J.

PS HEATERS

Car Heating and Ventilation

is one of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment. Now is the time to get your cars ready for next winter. Write for details.

The Peter Smith Heater Company
1725 Mt. Elliott Ave., Detroit, Mich.

Electric car heaters—thermostatic control—pneumatic car door operators—buzzers, single-stroke bells, starting signal lights—special resistances.

CONSOLIDATED CAR HEATING CO.
ALBANY, NEW YORK, CHICAGO

Tickets and Cash Fares.

THE CLEVELAND

accommodates both

The Cleveland Fare Box Co.
CLEVELAND OHIO
Canadian Cleveland Fare Box Co., Ltd.,
Preston Ontario

ELECTRIC RAILWAY JOURNAL

Think "SEARCHLIGHT" First

ADVERTISING RATES

POSITIONS VACANT—Business Opportunities and other undisplayed ads, 8 cents a word, minimum $2.00 an insertion.

POSITIONS WANTED—Evening work wanted, tutoring and other undisplayed ads of individuals looking for employment, 4 cents a word, minimum 75 cents, payable in advance.

ADD 5 WORDS for box number in undisplayed ads if replies are to any of our offices. There is no extra charge for forwarding replies.

DISCOUNT OF 10% if one payment is made in advance for 4 consecutive insertions of undisplayed ad.

ADS IN DISPLAY TYPE—Space is sold by the inch (30 in. to a page), the price depending upon total space used within a year, some space to be used each issue.

RATE PER INCH for ads in display space:

1 to 3 in., $4.50 an in.	15 to 29 in., $3.90 an in.
4 to 7 in., $4.30 an in.	30 to 49 in., $3.80 an in.
8 to 14 in., $4.10 an in.	50 to 99 in., $3.70 an in.

POSITIONS VACANT

COMMERCIAL manager. The man we want is not fully developed in the street railway business. He may not be a street railway man even, but if selected he must be a "go-get 'er." His duties will be to increase business. He will be required to sell rides in large numbers. Doing that he may have to create the reason for the ride. Salary as high as your qualifications. In reply tell what you would do to merchandise transportation on a street railway. How would you do it and can you do it? Applications confidential of course. P-342, Elec. Ry. Journal, Real Estate Trust Bldg., Phila.

WANTED—A first class armature winder foreman. Man capable of handling a large winding room and familiar with all modern methods. Location Central States. P-335, Elec. Ry. Journal, Leader-News Bldg., Cleveland, O.

POSITIONS WANTED

ELECTRICAL engineer, graduate of University of Illinois; age 29. Has 4½ years of good experience electric railway maintenance and valuation of railway, gas, electric, water, ice and steam heat properties; good construction experience abroad. Present completing two year valuation large public utility. PW-352, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

GENERAL superintendent of operation of combined light, power, traction and gas property, desires change. Competent to take charge of property either as manager or assistant manager. Has made good record in charge of utilities operation and water power development. Can furnish best of references. Personal reasons for desiring change. PW-350 Elec. Ry. Journal, Old Colony Bldg., Chicago. Ill

POSITION wanted as electrical repair man on city, or interurban cars; with seven years' experience; night work preferred. PW-349, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

POSITION wanted by experienced armature winder or controller man; six years' experience. PW-348, Elec. Ry. Jour., Real Estate Trust Bldg., Phila., Pa.

SUPERINTENDENT; 17 years' railway experience in Eastern Ohio, technical training, desires change, qualified to assume entire charge. PW-347, Elec. Ry. Jour., Leader News Bldg., Cleveland, O.

SUPERINTENDENT of transportation with a proven record of 17 years with large city and interurban properties, desires a change. Very successful in dealing with public and labor and knows how to get results from employees. High grade references as to character and ability. Would prefer a good size city property. Relations with present employers are pleasant and satisfactory. Personal reasons for desiring a change. PW-351 Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

IMMEDIATE DELIVERY

2—1000-Kw. Westinghouse Synchronous Motor Generator Sets

Motor end—1400 kva. 2300/4000 volts, 80% P.F., 3 phase, 60 cycle, with direct connected exciter.
Generator end—1000 kw. interpole design, 600 volt, 1666 amp., speed 514 r.p.m.
2—300 kw. 25 cycle, 3 phase, ROTARY CONVERTERS 360 volts A.C. 600 volts, D.C., 500 r.p.m. with 15000/360 volt transformers. Will sell with or without the transformers. Can sell at very low price.

Outfits were built to operate continuously under 35 degree rise in temperature. Send for further details and prices.

ARCHER & BALDWIN, INC., 114 LIBERTY ST., NEW YORK CITY
Telephones 4337-4338 Rector

An Insurance Policy Never Put Out a Fire!

Genuine One Quart "Pyrene" Fire Extinguishers

complete with Bracket and Charge; Selling Regularly $10, Special Price.

$4.95 ea.

$51.00 Per Dozen

F. O. B. New York or Wayne, Pa.

These are the regular Brass Polished "PYRENE" and are Government Surplus Material. They have just been brought back from France, and are in excellent condition.

Money back if not satisfied

The Franklin Stores
Wayne, Pa.

For 20 Years

we have been
Buying and Selling

Second-Hand Cars

Trucks and Motors

At Your Service

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa

WE WANT

4—DOUBLE TRUCK

Snow Plows

Rotary Nose or Shear

TRANSIT EQUIPMENT CO.
Cars—Motors
501 Fifth Avenue, New York

700 tons new 9 in.

GIRDER RAIL

Penna. Steel Co. Section 228, 107 lb. to the yard. Attractive price upon application. Subject to R. W. Hunt & Company's Inspection. Prompt shipment.

H. M. FOSTER COMPANY
Continental Building, Baltimore, Md.

Notice to Advertisers

Owing to the holiday—Columbus Day, Wednesday, October 12th—the *"Searchlight"* pages of the October 15th issue of the *Electric Railway Journal* will close for press a day earlier than usual.

CHANGES OF COPY

and new advertisements for the October 15th issue should reach us on or before

10 A. M., TUESDAY OCTOBER 11TH

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Purifiers
Horne Mfg. Co.

Anchors, Guy
Electric Service Sup. Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Armature Shop Tools
Elec. Service Supplies

Automobiles and Buses
Brill Co., The J G
Fifth Ave. Coach Co.

Axles
Bemis Car Truck Co.
St. Louis Car Co.

Axles, Car Wheel
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
Standard Steel Works Co.
Westinghouse E. & M. Co.

Axle Straighteners
Columbia M. W. & M. I. Co.

Babbitt Metal
Ajax Metal Co.
More-Jones Br. & Metal Co.

Babbitting Devices
Columbia M. W. & M. I. Co.

Badges and Buttons
Electric Service Sup. Co.
Internat'l Register Co., The

Batteries, Storage
Elec. Storage Battery Co.

Bearings and Bearing Metals
Ajax Metal Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
General Electric Co.
More-Jones Br. & Metal Co.
St. Louis Car Co.
Westinghouse E. & M. Co.

Bearings, Center and Roller Side
Stucki Co., A.

Bells and Gongs
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.
St. Louis Car Co.

Benders, Rail
Niles-Bement-Pond Co.
Railway Track-work Co.

Bending Apparatus
Railway Track-work Co.

Boilers
Babcock & Wilcox Co.

Boiler Tubes
National Tube Co.

Bond Testers
American Steel & Wire Co.

Bonding Apparatus
American Steel & Wire Co.
Electric Ry. Improv. Co.
Electric Service Sup. Co.
Ohio Brass Co.

Bonds, Rail
American Steel & Wire Co.
Copper Clad Steel Co.
Electric Ry. Improv. Co.
Electric Service Sup. Co.
General Electric Co.
Ohio Brass Co.
Railway Track-work Co.
Westinghouse E. & M. Co.

Book Publishers
McGraw-Hill Book Co.

Bond Testers
Elec. Service Supplies Co.

Boring Tools, Car Wheel
Niles-Bement-Pond Co.

Boxes—Junction and Outlet
National Metal Molding Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, etc.)
American Bridge Co.
Bates Exp. Steel & Tr. Co.
Electric Ry. Equip. Co.
Electric Service Sup. Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Hamilton & Hansell, Inc.
National Ry. Appliance Co.
Smith-Ward Brake Co.
Westinghouse Tr. Br. Co.

Brake Shoes
Amer. Br. Shoe & Fdry. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.
Weierbach Brake Shoe Co.

Brakes, Brake Systems and Brake Parts
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
Horne Mfg. Co.
National Brake Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.

Brass and Bronze Prods.
Amer. Copper Prods. Corp.

Bridges and Buildings
Amer. Bridge Co.

Brooms, Track, Steel or Rattan
Amer. Rattan & Reed Mfg. Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
Morganite Brush Co., Inc.
U. S. Graphite Co.
Westinghouse E. & M. Co.

Brush Holders
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.

Bunkers Coal
American Bridge Co.

Bus Bars
Amer. Copper Prods. Corp.

Buses, Motor
Fifth Ave. Coach Co.
Trackless Trans. Co.

Bushings
Nat'l Fibre & Insulation Co.
Nat'l Metal Molding Co.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.

Cables (See Wires and Cables)

Cambric Tapes, Yellow and Black, Varnished
Irvington Varnish & Ins. Co.

Cambric, Yellow and Black, Varnished
Irvington Varnish & Ins. Co.

Carbon Brushes (See Brushes, Carbon)

Car Lighting Fixtures
Elec. Service Supplies

Car Panel Safety Switches
Westinghouse E. & M. Co.

Cars, Dump
Differential Car Co.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
St. Louis Car Co.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
Electric Storage Battery Co.
General Electric Co.

Castings, Brass, Composition or Copper
Ajax Metal Co.
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Br. & Metal Co.

Castings, Gray Iron and Steel
American Bridge Co.
American Steel Foundries
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Standard Steel Works Co.
St. Louis Car Co.

Castings, Malleable and Brass
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Catchers and Retrievers, Trolley
Earl, C. I.
Electric Service Sup. Co.
Ohio Brass Co.
Wood Co., Chas. N.

Ceiling, Car
Pantasote Co.

Circuit Breakers
Automatic Reclosing Circuit Breaker Co.
Condit Elec'l. Mfg. Co.
Cutter Co.
General Electric Co.
Westinghouse E. & M Co.

Clamps and Connectors for Wires and Cables
Anderson Mfg. Co., A. & J. M.
Electric Ry. Equip. Co.
Electric Service Sup. Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Cleaners and Scrapers—Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Ohio Brass Co.

Cleats
Nat'l Metal Molding Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

Coil Banding and Winding Machines
Columbia M. W. & M. I. Co.
Comstock Mfg. Co.
Electric Service Sup. Co.

Coils, Armature and Field
Cleveland Armature Works
Columbia M. W. & M. I. Co.
Comstock Mfg. Co.
General Electric Co
Westinghouse E. & M. Co.

Coils, Choke and Kicking
Electric Service Sup. Co.
General Electric Co.
Westinghouse E. & M. Co.

Coin-Counting Machines
Electric Service Sup. Co.
Internat'l Register Co., The
Johnson Fare Box Co.

Commutator Slotters
Electric Service Sup. Co.
General Electric Co.
Westinghouse E. & M. Co.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Elec'l. Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.

Compressors, Air
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Tr. Br. Co.

Condensers
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Condensor Papers
Irvington Varnish & Ins. Co.

Conduits, Interior
Nat'l Metal Molding Co.

Connectors, Solderless
Frankel Connector Co.
Westinghouse E. & M. Co.

Connectors, Trailer Car
Electric Service Sup. Co.

Controllers or Parts
Allis-Chalmers Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Electric Service Sup. Co.

Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.

Converters, Rotary
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Conveying and Hoisting Machinery
Amer. Bridge Co.
Columbia M. W. & M. I. Co.

Copper Products
Amer. Copper Prods. Corp.

Copper Wire
Anaconda Copper Min. Co.
Copper Clad Steel Co.

Cord Adjusters
Nat'l Fibre & Insulation Co.

Cord, Bell, Trolley, Register, etc.
Brill Co., The J. G.
Electric Service Sup. Co.
Internat'l Register Co., The
Roebling's Sons Co., J. A.
Samson Cordage Works
Silver Lake Co.

Cord Connectors and Couplers
Electric Service Sup. Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
Amer. Steel Foundries
Brill Co., The J. G.
Ohio Brass Co.
Van Dorn Coupler Co.
Westinghouse Tr. Br. Co.

Cranes
Allis-Chalmers Mfg. Co.
Niles-Bement-Pond Co.

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossing Signals (See Signals, Crossing)

Crossings, Frog and Switch
Wharton, Jr., & Co., Wm.

Crossings, Track (See Track, Special Work)

Crushers Rock
Allis-Chalmers Mfg. Co.

Curtains and Curtain Fixtures
Brill Co., The J. G.
Electric Service Sup. Co.
Pantasote Co.
St. Louis Car Co.

Dealers' Machinery
Archer & Baldwin
Electric Equipment Co.

Derailing Devices (See also Track Work)
Wharton, Jr., & Co., Wm.

Destination Signs
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.

Detective Service
Wish Service, P. Edward

Dogs, Lathe
Williams & Co., J. H.

Door Operating Devices
Con. Car Heating Co.
Nat'l Pneumatic Co. Inc.

Doors and Door Fixtures
Brill Co., The J. G.
General Electric Co.
Hale & Kilburn Co.

Doors, Folding Vestibule
Nat'l Pneumatic Co., Inc.

Doors and Shutters, Fireproof
Kinnear Mfg. Co.

Doors, Steel Rolling
Kinnear Mfg. Co.

Draft Rigging (See Couplers)

Drills, Track
American Steel & Wire Co.
Electric Service Sup. Co.
Niles-Bement-Pond Co.
Ohio Brass Co.

Dryers, Sand
Electric Service Sup. Co.

Electrically Operated Switches (Air or Oil)
Condit Elec'l. Mfg. Co.

Electrical Wires and Cables
Amer. Electrical Works
American Steel & Wire Co.
Roebling's Sons Co., J. A.

Engineers, Consulting, Contracting and Operating
Allison & Co., J. R.
Archbold-Brady Co.
Arnold Co., The
Beeler, John
Byllesby & Co., H. M.
Clark & Co., Mgr., Corp., E. W.
Day & Zimmermann
Engel & Hevenor, Inc.
Feustel, Robert M.
Ford, Bacon & Davis
Gould, L. E.
Hemphill & Wells
Holst, Englehardt W.
Jackson, Walter
Kelly, Cooke & Co.
Parsons, Klapp, Brinkerhoff & Douglas
Richey, Albert S.
Sanderson & Porter
Sangster & Matthews
Smith & Co., C. E.
Stone & Webster
White Engineering Corp., The J. G.

Engines, Gas, Oil or Steam
Allis-Chalmers Mfg. Co.
Westinghouse E. & M. Co.

Fare Boxes
Cleveland Fare Box Co.
Economy Elec. Devices Co.
Johnson Fare Box Co.
National Ry. Appliance Co.
Ohmer Fare Register Co.

Fences, Woven Wire and Fence Posts
American Steel & Wire Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Cleveland Fare Box Co.
Con. Car Fender Co.
Electric Service Sup. Co.

Fibre and Fibre Tubing
Continental Fibre Co.
Nat'l Fibre & Insulation Co.
Westinghouse E. & M. Co.

Field Coils (See Coils)

Filters, Water
Scaife & Sons Co., Wm. B.

Floodlights
Electric Service Sup. Co.

Flooring Composition
Amer. Mason Safety Tread Co.

Floor Plates
Amer. Abrasive Metals Co.

Forgings
Carnegie Steel Co.
Columbia M. W. & M. I. Co.
Standard Steel Works Co.
Williams & Co., J. H.

Frogs, Track (See Track Work)

Funnel Castings
Wharton, Jr., & Co., Wm.

Fuses and Fuse Boxes
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.
Williams & Co., J. H.

Fuses, Refillable
Columbia M. W. & M. I. Co.
General Electric Co.

Gages, Oil and Water
Ohio Brass Co.

Gaskets
Power Specialty Co.
Westinghouse Tr. Br. Co.

Gas-Electric Cars
General Electric Co.

Gasolene Torches
Economy Elec. Devices Co.

Gas Producers
Westinghouse E. & M. Co.

Gates, Car
Brill Co., The J. G.

Gear Blanks
Carnegie Steel Co.
Standard Steel Works Co.

Gear Cases
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.
Westinghouse E. & M. Co.

Gears and Pinions
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.
General Electric Co.
National Ry. Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.

Generating Sets, Gas-Electric
General Electric Co.

General Printing
Shanklin Equip. Co.

Generators
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Gongs (See Bells and Gongs)

Graphite
Morganite Brush Co., Inc.

Grates, Chain
Green Eng. Co.

Greases (See Lubricants)

Grinders and Grinding Supplies
Metal & Thermit Corp.
Railway Track-work Co.

Grinders, Portable Elec.
Seymour Portable Rail Grinder Co., E. P.

Grinding Blocks and Wheels
Railway Track-work Co.

Guards, Cattle
Amer. Bridge Co.

Guards, Trolley
Electric Service Sup. Co.
Ohio Brass Co.

Hacksaws
Gladium Co., Inc.

Harps, Trolley
Anderson Mfg. Co., A. & J. M.
Bayonet Trolley Harp Co.
Electric Service Sup. Co.
More-Jones Br. & Metal Co.
Nuttall Co., R. D.
Star Brass Works

Headlights
Electric Service Sup. Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

Headlining
Pantasote Co.

Heaters, Car (Electric)
Con. Car Heating Co.
Economy Elec. Devices Co.
Gold Car Heating & Lighting Co.
National Ry. Appliance Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Cooper Heater Co.
Smith Heater Co., Peter

Heaters, Car (Stove)
Electric Service Sup. Co.
Smith Heater Co., Peter

Hoists and Lifts
Columbia M. W. & M. I. Co.
Ford Chain Block Co.
Niles-Bement-Pond Co.

Hose, Bridges
Ohio Brass Co.

Hydraulic Machinery
Allis-Chalmers Mfg. Co.
Niles-Bement-Pond Co.

They are uniform in quality

They talk for themselves

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Montreal and Toronto

B. A. Hegeman, Jr., President
Charles C. Castle, First Vice President W. C. Lincoln, Mgr. Sales & Engineering
Harold A. Hegeman, Vice Pres. and Treas. Fred C. J. Doll, Secretary

National Railway Appliance Co.
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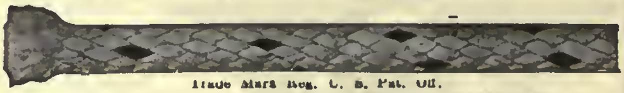

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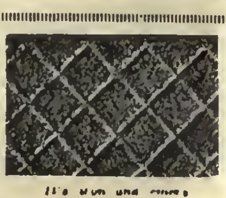

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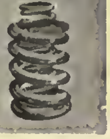

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Standard for Electric Railway Service
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Standard for 25 years for car and station steps.
STANWOOD STEPS
Self-cleaning, non-slipping, light weight
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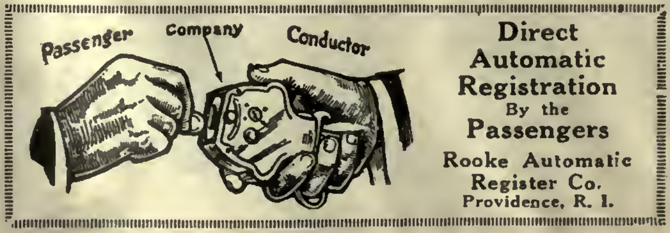

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Boyerize?

SURE!

There may be room for argument as to whether your service calls for wooden, rattan, or upholstered seats; skip-stops or all stops; orange yellow or pullman green for your car exteriors; fenders or wheel-guards; and so with many other things that affect the comfort, attractiveness and safety of your service.

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You want safety? Sure!

More revenue mileage between inspections? Sure!

Better feeling on the part of your motormen and shopmen? Sure! Real dollars made in getting more mileage and spending less on replacements and accidents? Sure!

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Boyerized longer-life equipment includes:

Brake Pins and Bushings
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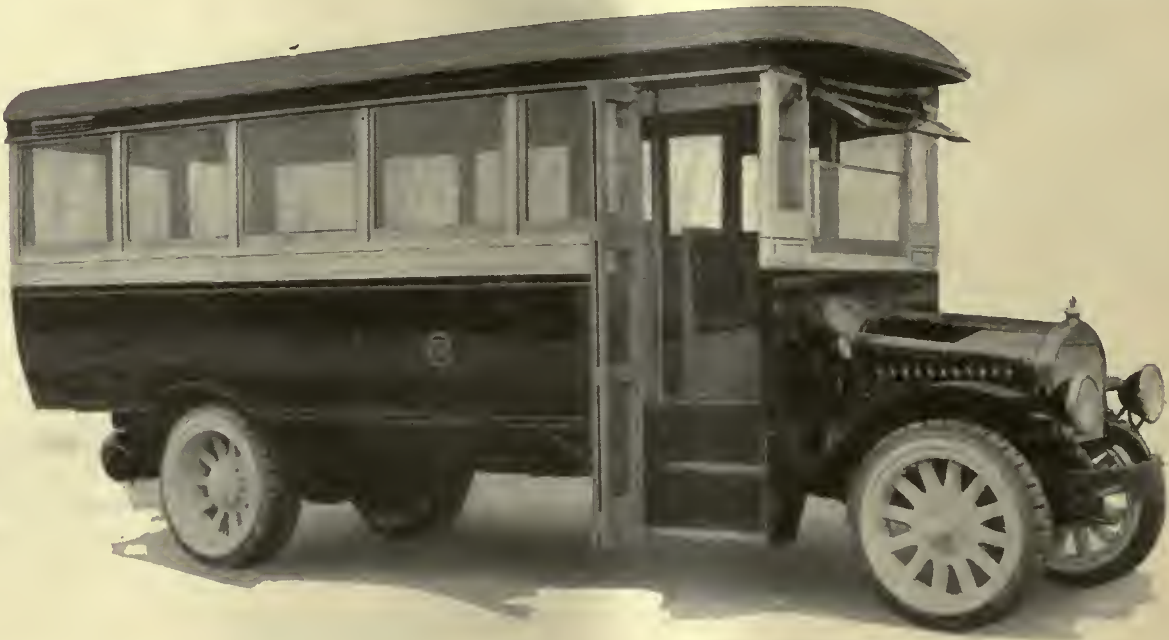
Boyerized Wearing Plates between the Bolster and Bolster Carrier
Boyerized Wearing Plates between the Pedestal Straps and the Journal Box
Boyerized Pins and Bushings for Door Fixtures

To keep up to the highest level

BOYERIZE!

BEMIS CAR TRUCK COMPANY
Springfield, Mass.

BRILL MOTORBUS BODIES



25-passenger vehicle constructed for supplementary service to electric railway in Pennsylvania.

The motorbus illustrated, which was designed and constructed according to the best carbuilding practices, also may be obtained in capacities for 21, 29 and 37 seated passengers.

Electric railways, which can use the motorbus to advantage as feeders to their existing lines—and there is evidently a field for this type vehicle—will find that their requirements will be well taken care of by motorbuses with Brill bodies of the design illustrated in any of the capacities mentioned above.

A copy of Brill Bulletin No. 253
will be mailed upon request.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

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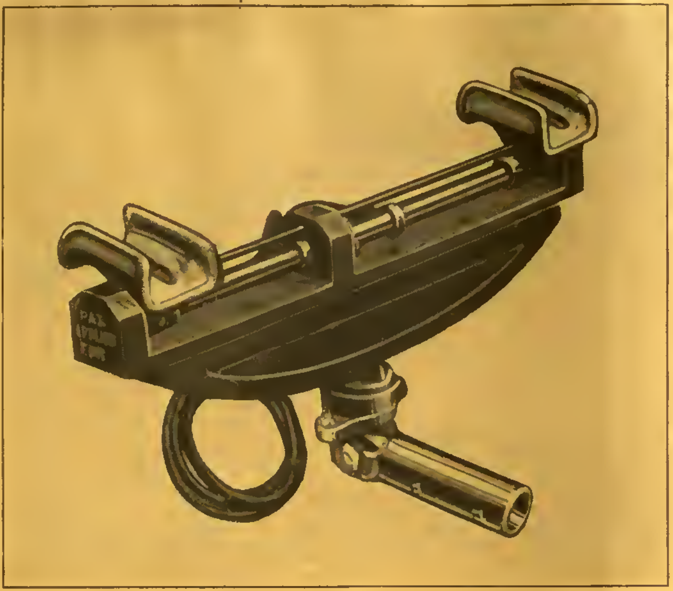

Brill "Rail-less" Car Has Novel Current Collector

One feature of the Brill "Rail-less" Car, which is attracting particular attention, is its Current Collector.

This device, which was specially developed to meet requirements of American transportation, permits operation with a single pole and performs its function efficiently with the car as far as 16 ft. off center. Also, with this type Collector it is possible to turn the car completely around within a radius of 40 feet without disengaging the wires.

Demonstrations made with the Brill "Rail-less" Car and its novel type Current Collector have proven their suitability for American service.

Bulletin No. 254 gives the details of this "Rail-less" car. If you have not received your copy, it will be sent on request.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

AMERICAN CAR CO. — ST. LOUIS MO.
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The product of the Collier Organization for the Electric Railways is an unvarying income from their car card space.

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INCORPORATED
Candler Bldg., New York

McGraw-Hill Co., Inc. October 15, 1921 Twenty Cents Per Copy

Special Mechanical and Engineering Edition

ELECTRIC RAILWAY JOURNAL

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and
MANSON FRICTION
TAPES

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The Approaching Winter

Winter with its storms and drifts of snow, ice and slush, tests the stability of even the best electric railway system. Its coming cannot be avoided, but adequate preparation will make its effects less severe.

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Recollection of the winter of 1919-1920 should prompt all Electric Railways to prepare now

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Vol. 58, *No.* 16 New York, October 15, 1921 *Pages* 671-722

Electric Railway Journal

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing-Editor

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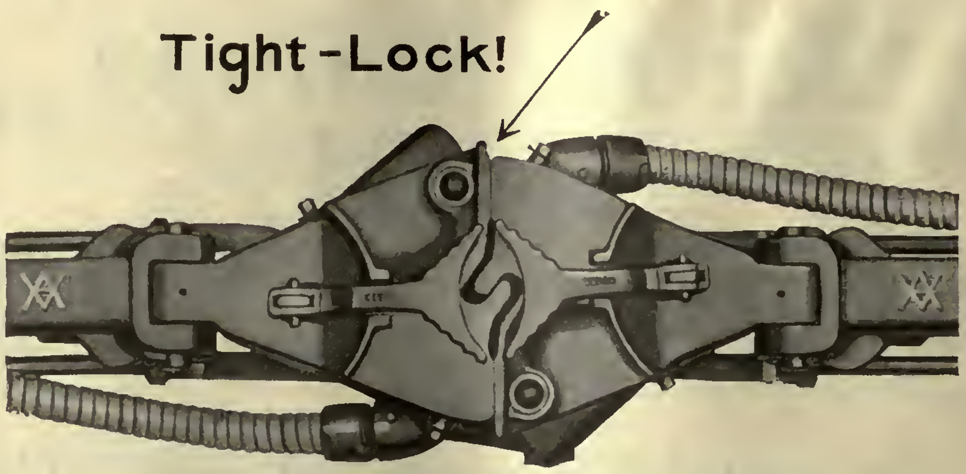

Tight-Lock!

Car, Air and Electric Coupler

AUTOMATIC type K-1-A

Coupler Head, Showing Electric Portion and Lock Reset Trigger.

THE K-1-A does just what it was always hoped an automatic coupler would do.

Its complete practicality is vouchsafed by electric railway officials who have adapted it to their operations, subjecting it to the actual test of hard, every-day service over a period of years.

Three operations in one—the impact of the couplers locking the cars securely together; establishing rigid, tightly-sealed air connections, and forming electric connections with clean contacts which insure full carrying capacity without over-heating.

Designed in the interests of HUMAN SAFETY and TIME ECONOMY. Adapted for multiple motor, or motor and trailer, operation.

The K-1-A can be furnished with or without the electric portion, provision being made so that this feature may be added at any time.

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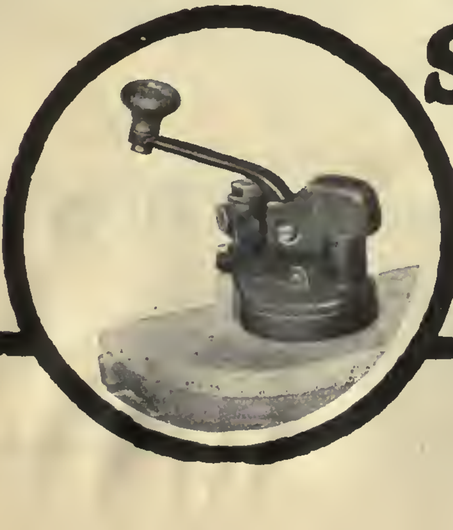
The Supreme Test—
NEW YORK TRAFFIC
Successfully Met by
the SAFETY CAR

TWO years' service in the congested traffic of Greater New York has been the supreme test of the Safety Car. First it won success as a distinctly advantageous form of transportation for the small or medium-sized community. Then it was "drafted" to meet the serious conditions which developed in many cities of 100,000 to 200,000 population. Now it operates across Brooklyn Bridge, in the midst of the rush and turmoil of New York's seven million.

The Brooklyn Rapid Transit Company purchased 200 Safety Cars in 1919. The splendid results they are producing leave nothing to be desired in the way of evidence as to the remarkable adaptability of the Safety Car to any system of street railway transportation.

The size and population of the territory served has no bearing on the question of whether the Safety Car will prove a profitable investment—It has never failed yet.

In use on 340 railways in the United States, Canada, Mexico and Cuba.



SAFETY CAR DEVICES CO.
OF ST. LOUIS, MO.
Postal and Telegraphic Address:
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It is not a safety car unless equipped with our standard Air Brake and Safety Car Control Devices.

A group of Thermit Welded Motor Cases ready for service.

Thermit Weld Your Broken Motor Cases

The only method for this class of reclamation work which can be depended on to give a reliable repair which will stand up in service.

According to a recent report from the Toledo shops, about 100 Thermit welds had been made with the most satisfactory results on motor cases and truck frames. They state:

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Pittsburgh, Brooklyn and a number of other electric railway systems are also making substantial savings by this reliable repair method.

Let us send you an experienced Thermit welder to instruct your men in carrying out this work themselves. Now is the time for saving. Start at once.

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ECONOMY

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"What do we need from the roof up?" is one of the first questions the railway man asked when trackless trolley was suggested.

We are ready to answer.

Complete current collecting apparatus—including Bases, Insulated Poles and Swivel Harps—has ben designed by O-B Engineers. The equipment has been successful in actual operation while the Bus sped on the straightaway, dodged traffic and turned loops.

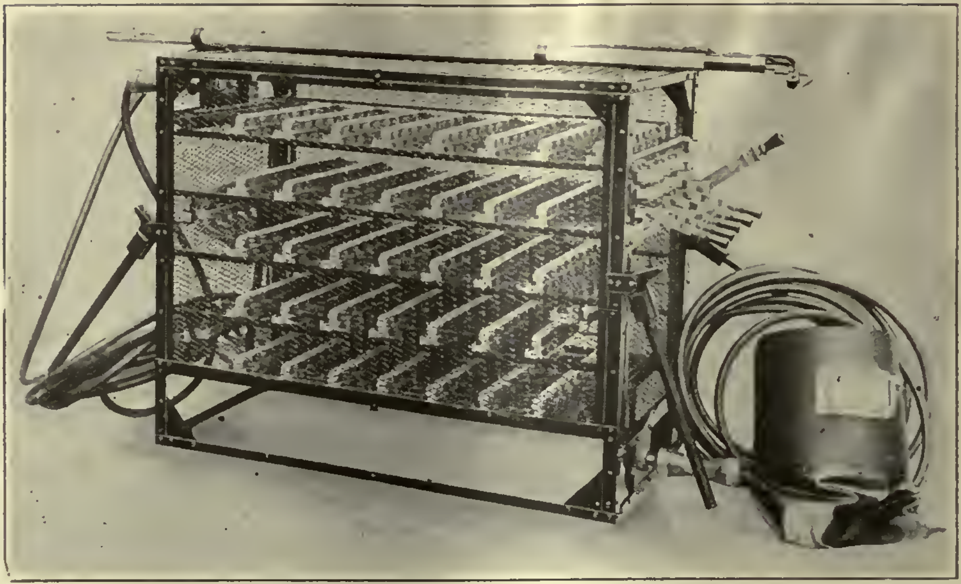
Details of overhead suspension on tangent, at loops, and at terminals have also been worked out with standard O-B Line Materials—right out of the railway's own stockroom.

Imperial Headlights, especially adapted for trackless trolley operation, are ready. The equipment can be operated from the trolley or so arranged that normally it takes current from the trolley and in emergencies a battery supplies the necessary current.

Our information, data and experience are at your command

The Ohio Brass Co.
Mansfield, Ohio, U.S.A.

New York Philadelphia Pittsburgh Charleston, W. Va. Chicago Los Angeles San Francisco Paris, France
Products: Trolley Material, Rail Bonds, Electric Railway Car Equipment, High Tension Porcelain Insulators, Third Rail Insulators



Ajax Electric Arc Welder

Consider the High Capacity Factor

How often it happens that a piece of poor welding proves defective after the first few cars run over it. The reason for many an unsuccessful track welding job is found in the lack of capacity of the average welding outfit. Designed for the standard trolley potential of 550-600 volts, they fail to deliver the necessary amperes of current when the line voltage sags, as often happens on street railway lines at any distance from the power plant or substation.

The AJAX welder was designed by men thoroughly familiar with these and other average railway conditions. Not only in its ability to deliver high currents at low voltage, but in its simplicity of construction, ease of manipulation, and lightness of weight, it shows the hand of the "practical railroad man."

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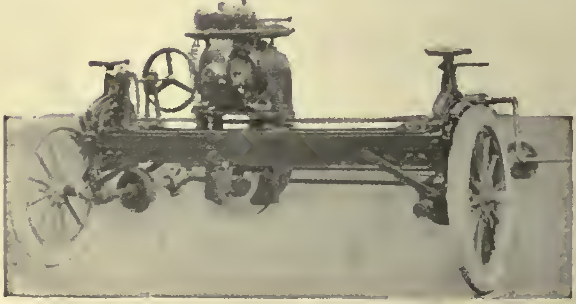
For every kind of Track Grinding.



UNIVERSAL Rotary Track Grinder

ATLAS
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RAIL and TRACK GRINDERS

Railway Track-work Co.
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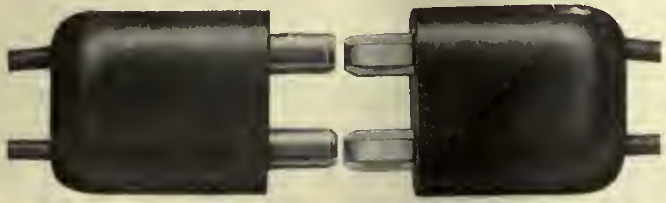
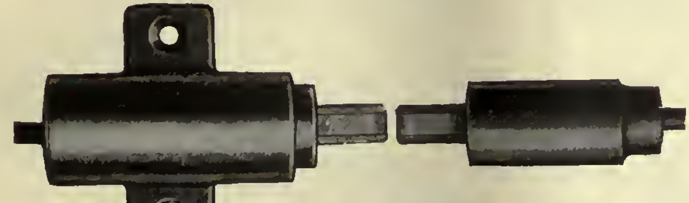


Keystone Double Pole Trailer Car Connectors for extending signal systems from the motor car to the trailer. Capacity 10 amperes.



Keystone Single Pole Trailer Car Connectors for connecting car circuits requiring a capacity of 75 amperes.

Subway or elevated trains—suburban or city cars—safety cars or trackless trolley buses—whatever kind of rolling stock you are operating should be equipped with the most up-to-date safety appliances and the most modern conveniences for your riders and operators. You'll find such on our list.

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Check off your wants then write for complete data sheets

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- ☐ Keystone Air Valves
- ☐ Golden Glow Headlights
- ☐ Illuminated Destination Signs
- ☐ Keystone Steel Gear Cases
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- ☐ Faraday Car Signals
- ☐ Keystone Trolley Catchers
- ☐ Shelby Trolley Poles
- ☐ Samson Cordage
- ☐ International Fare Registers
- ☐ Fare Register Fittings
- ☐ Keystone Cord Connectors
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Scarcely a place you can go now-a-days that you do not see the standard safety car with its ever-present ally of safety, the H-B Life Guard. Equip all your cars, old and new, for maximum safety.

The Consolidated Car Fender Co.
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General Sales Agent
Wendell & MacDuffie Co., 61 Broadway, New York

Protect the 82%
By Using Steel Twin Ties

82% of the cost of a typical design of concrete track foundation is for items other than ties. Yet the success or failure of the track is largely dependent on the tie used.

Even if the tie selected increases the cost of the construction it is justified to protect the larger part of the investment.

But, with STEEL TWIN TIES, the first cost of the construction is less than with wood ties in concrete.

Protect the 82% and save in first cost, too.

The complete data is sent on request, in a permanent folder. Write *now*.

Steel Twin Tie Track

THE INTERNATIONAL STEEL TIE COMPANY, Cleveland, Ohio

International Steel Twin Ties manufactured and sold in Canada by Sarnia Bridge Co., Ltd., Sarnia, Ont.

"After 12 Years In Railway Service These Armco Culverts When Last Inspected Were

IN PERFECT CONDITION

Because they are economically transported, are easily and quickly installed, and make permanent improvements, railroads are using Armco Culverts in greater numbers each succeeding year.

Up to 5,000 feet of Armco Culverts, in diameters of 30 inches and less, may be loaded on a flat car and the total weight will be well within the capacity of the car. Hence transportation charges per unit section are extremely low when Armco Culverts are used.

The actual work of installation in the majority of cases is quickly and easily done by common labor—the usual method being to dig a trench and roll the culvert in. Concrete and rubble head walls—although not absolutely necessary, because of the rodded end construction of Armco Culverts—add to the appearance of the job and give extra protection to the culvert ends.

But in addition to these favorable points the *permanence* of Armco Culverts makes them preferred by railroad engineers. Once installed they are there to stay, for the chemical purity, homogenous texture and heavy galvanizing of Armco Ingot Iron from which Armco Culverts are made insures rust resistance and long service.

TRADE MARK ARMCO REG. U.S. PAT. OFF. Resists Rust Ingot Iron

There is a manufacturer in nearly every state, and in Canada, making genuine rust-resisting ARMCO CULVERTS and other products of Armco Ingot Iron such as flumes, siphons, tanks, road signs, roofing, etc. Write for full information and nearest shipping point on products in which you are interested.

ARMCO CULVERT & FLUME MFRS. ASSN.
215 NORTH MICHIGAN AVE. CHICAGO

Pneumatize! *Modernize!*

Washington Did It Right!

If you'll be good enough to analyze the article on "Control Trailers in Washington," published Sept. 17, 1921, you will see more clearly what we mean by National Pneumatic experience in adaptation to specialized needs as well as in general economies. For instance:

There's air economy: Only 1/36 cu. ft. for each complete opening and closing cycle, due in part to the fact that the actuating valve is located directly on the engine.

There's minimum attention: The engine has splash feed lubrication, the grease which works out with the exhaust air being returned to the gear for re-use—hence two years' operation without refilling!

There's minimum maintenance: The engine is in a pocket above the doors, easily accessible for inspection, adjustment and oiling, aside from being at a high drainage point which eliminates moisture from the engine valve and prevents freezing. Also the non-tamperable cushioning feature which saves wear and tear on door and step fixtures, reduces glass breakage and avoids injury to the passenger's body and temper. And the door shafts are National Pneumatic to make a *perfect* job.

There's speed with safety: The closing of the doors gives a light signal to the motorman; and if there's anything amiss with the engine and starting mechanism, the motorman will get a *danger* signal.

And so on, and so on and so on. But we've said enough, we hope, to prove that National Pneumatic Engineering means more than the purchase of hardware. It's a *specialized service* to give you more money miles per hour.

The Complete National Pneumatic Line Comprises

Door and Step Control
Motorman's Signal Lights
Door and Step Operating Mechanisms
Safety Interlocking Door Control
Multiple Unit Door Control

Manufactured in Canada by
Dominion Wheel & Foundries, Ltd.
Toronto, Ont.

National Pneumatic Company, Inc.

Originator and Manufacturer

50 Church St., New York
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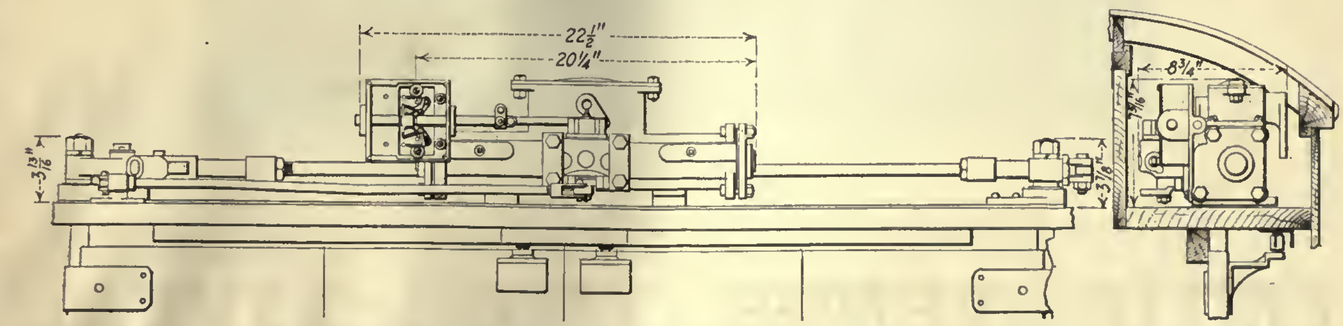

The FIFTH AVENUE

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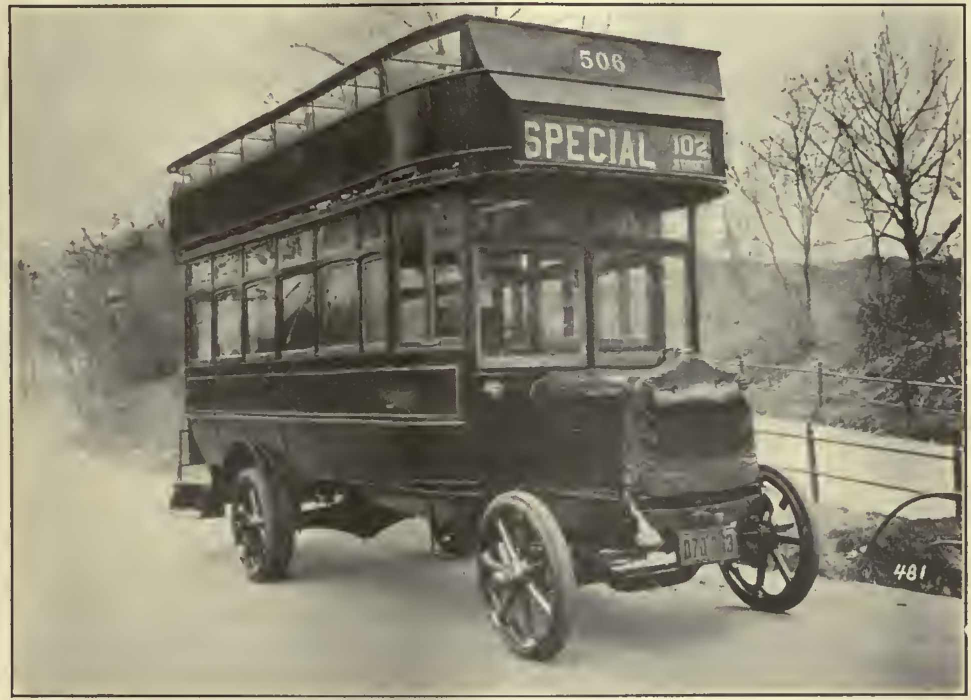
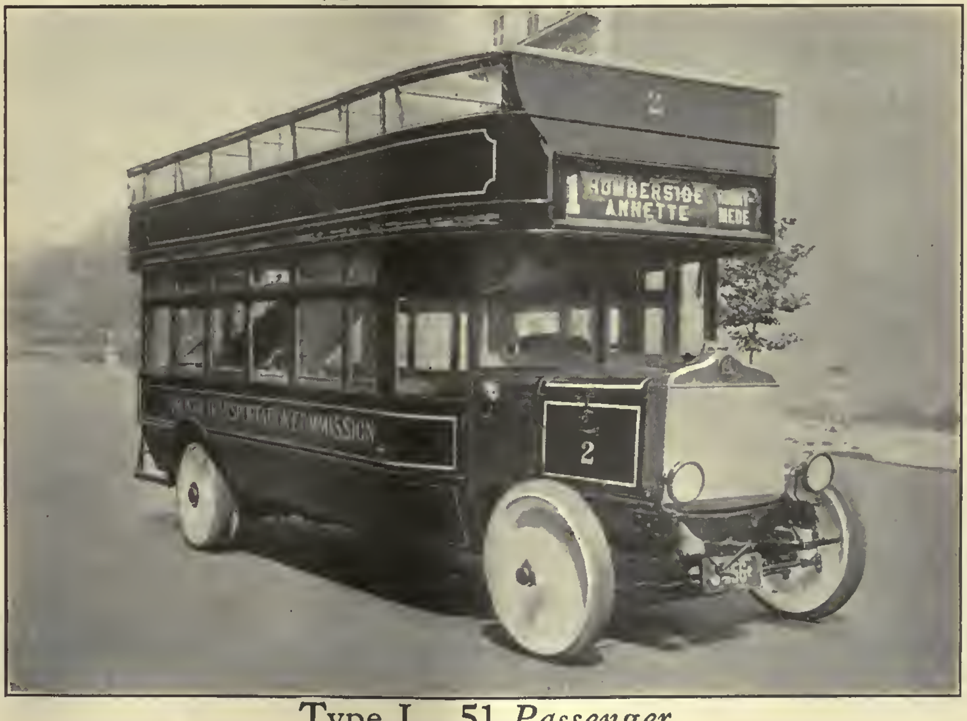


Type A—51 *Passenger*



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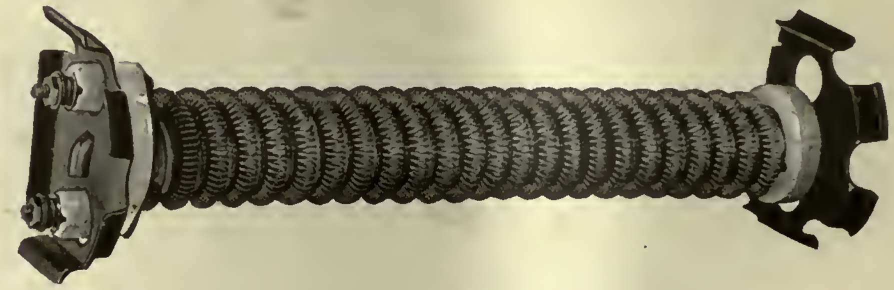

The resistance coil is perfectly supported at every point on a heavy porcelain insulator—Unaffected by vibration.

This construction exposes the wire freely to the air, so that heat escapes readily. It allows the use of the greatest amount of heavy wire in a given space run at a low temperature.

This means maximum efficiency and long life for the element.

Reliable in Service
Easy and Cheap to Repair
Will stand enormous overload without injury

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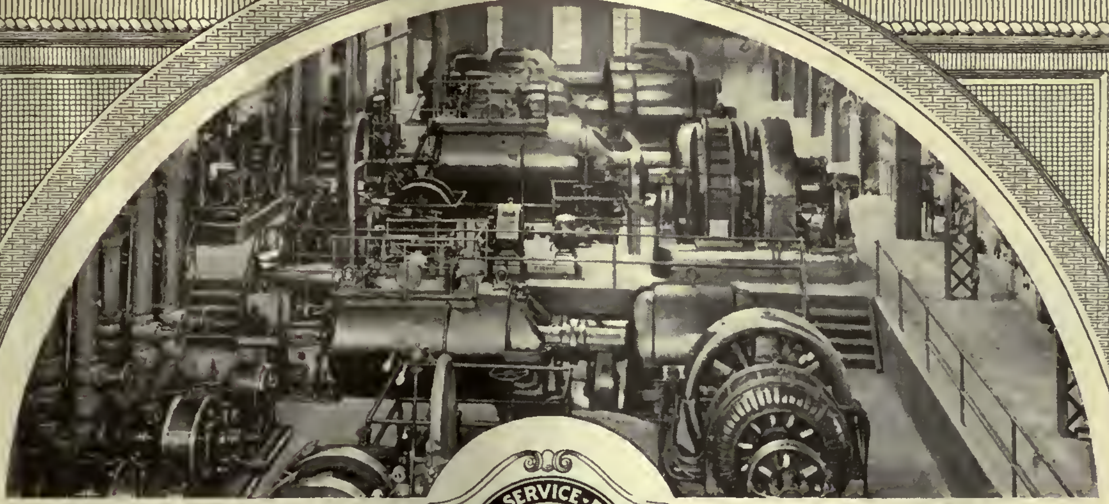

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The purest of mineral oil, non-emulsifying and absolutely free from acid or adulterations of any nature.

In turbine lubrication, oil quality is of utmost importance. As the only loss after installation is due to leakage, slight evaporation and wear, the consideration of lower prices is a serious mistake. The ultimate cost of cheap turbine oil is double the cost of Galena.

The test of a good turbine oil? There is only one—*actual service in the turbine.* It is by this practical and convincing test that Galena Turbine Oil has been specified on the representative properties throughout the entire country—another proof of *Galena Quality.*

The exceptional advantages of Galena Service show here at their best. Installation under the supervision of our mechanical experts means that henceforth efficiency and economy will mark the operation of this expensive equipment, with bearing parts protected and preserved by the lasting and ever reliable Galena Oil film—never yet equalled in satisfactory service.

Galena Service does not promise—but guarantees,
lubricating efficiency!

Galena-Signal Oil Company
New York - Franklin, Pa. - Chicago
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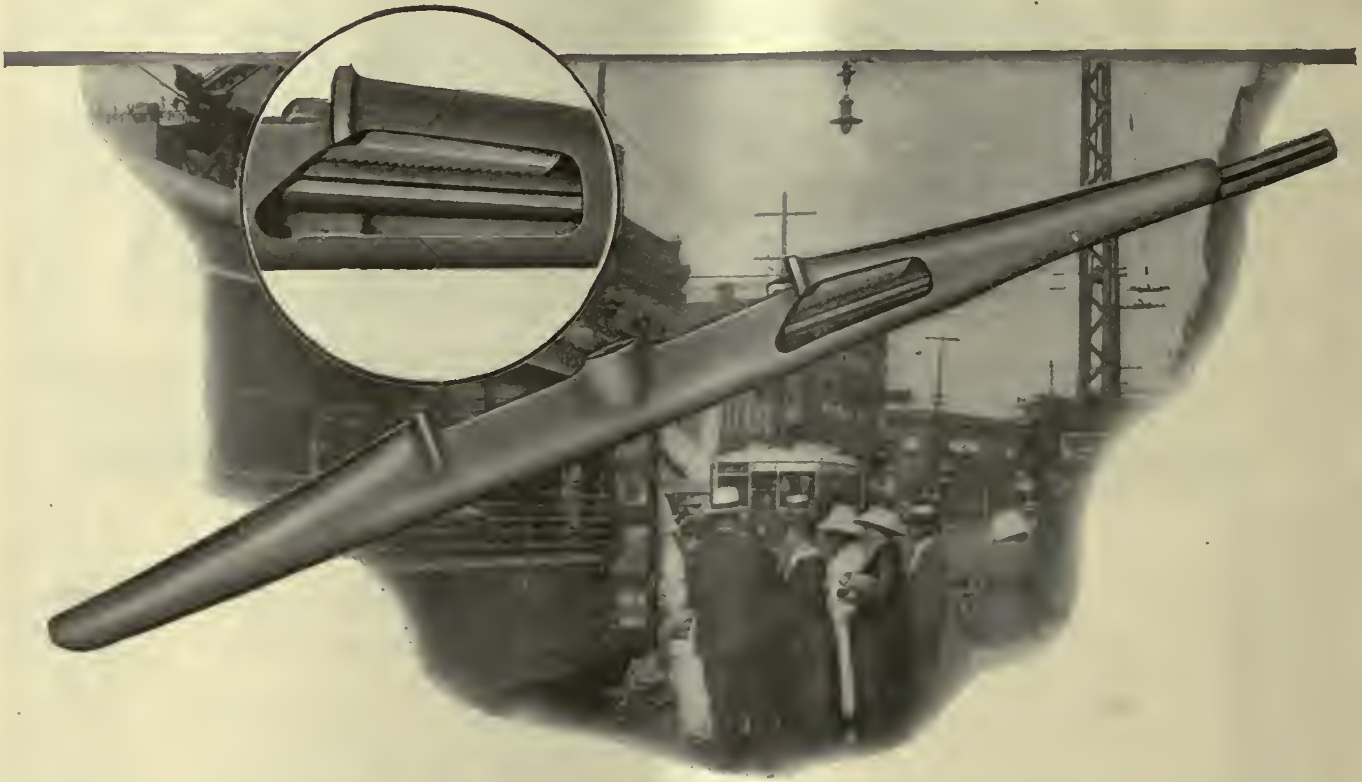
Maintenance of "overhead" is too important a matter to permit a weak link at that point in a railway's chain of service



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"Q" Splicing Ear.

"J" Splicing Ear.

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G-E R-3 Sleeves are good for hardest service

JOINTS and suspension points in a trolley line are stronger than the wire itself if the G-E R-3 Sleeve or Ear is used. Tests have proved that wire at breaking strain invariably parts *outside* this device, not *in* it.

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Electric Railway Journal

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T. & T. Association Will Consider Changes in Organization

AT THE Atlantic City convention changes in organization were considered not only for the American Association but for the T. & T. and Engineering Associations. In each of these associations they were recommended by the president and will be considered by the executive committee, with the possibility of course that a committee may be appointed in each body to work out the most satisfactory plan.

In the case of the T. & T. association, the first suggestion of the retiring president, R. P. Stevens, was that only one vice-president should be elected, the reason presumably being the same as that which prompted the reorganization committee of the American Association to propose that the method of electing vice-presidents in that body be changed so that there would be no order of precedence among the vice-presidents. One chief aim of this change was to do away with the plan usually followed of advancing each of the vice-presidents one step each year and thus avoiding the necessity of choosing a president four years before he will serve.

The argument in favor of a change in the T. & T. Association as well as in the American Association is not that the present plan has worked badly in the past. Both associations have been most fortunate as to the caliber of the men who have been called upon to serve as presidents of the associations. Nevertheless, there are good arguments in favor of giving the nominating committee a free choice, just as there are arguments for the present practice in the way of training vice-presidents for the presidency. If the T. & T. Association adopts the single vice-president plan there will be an opportunity of finding out how it will work out as compared with the four vice-president yearly promotion plan of the American Association. Somewhat curiously, in view of the adoption of the resolution at the 1920 session of the American Association in favor of getting away from the old system of advancement, the change was not even considered at the American meeting. The reason for this is probably that the association as a whole felt that a good many changes had been made and that it would be well to try them out before making others. As drafted, the constitution is thoroughly workable, and can easily be amended if such a plan should be considered desirable.

Other important suggestions by Mr. Stevens relating to the internal organization of the T. & T. Association were that the chairman of each committee be appointed if possible from the membership of the preceding year's committee, that the first vice-president of the association be ex officio chairman of the subjects committee, that two new committees be appointed to study the different phases of the trackless transportation subject and that *Aera* devote more space to articles of an educational nature for the benefit of employees in the transportation department. Altogether the address showed an earnest desire for improvement and a willingness to depart from precedent to accomplish that result.

Does the Engineering Association Constitution Need Revamping?

IN HIS ADDRESS before the Engineering Association at the Atlantic City Convention, W. G. Gove, retiring president, made some statements which seem at first rather startling. The address was taken up largely with suggestions as to ways in which Mr. Gove thought the functioning of the organization could be improved. He said frankly that these suggestions would not meet with universal approval. Probably they will not in detail, but they will in principle. The principle is that now is a good time to make a study of the workings of the association to learn whether some improvements may not profitably be introduced. This is timely now because the parent association has just completed such a study. The suggestion that a committee be appointed to go into this matter will meet with no opposition. If such a committee finds that present practice is satisfactory, the establishment of the fact will be worth while. The chances are ten to one that some changes will be found desirable.

To Mr. Gove's mind, the root of the trouble with committee work at present is that committee members have to pay their own expenses in attending meetings or else charge them to their expense accounts with their employers. There is some warrant for this conclusion, although the influence of the money item is probably not predominating. The way out would seem to be some kind of a mileage allowance, which would put all members on the same footing geographically, at least with respect to railroad fares. This is probably not practicable at once on account of the financial condition of the association, but the plan should be considered for adoption later.

Next, Mr. Gove wants committee work simplified. This is desirable and can be accomplished without changes in the constitution and by-laws. The executive committee appreciates the desirability of a simple program of committee work and will undoubtedly provide such for the coming year. Mr. Gove also wants more attention given to practical standardization. He suggests an advisory committee in the car design field to act as an intermediary between the manufacturers and the users. Such a committee could undoubtedly accomplish a great deal. The plan is worth a trial.

As to the "Engineering Manual," the retiring president voiced a rather general desire to have this invaluable reference book in more convenient form and in a form to insure up-to-dateness. The committee on standards has been struggling with this proposition for many years. It is a difficult one. If the volumes are bound up permanently and issued say every two years, there is much loss of good printed matter, but the appearance of each successive new volume insures the completeness of the Manual as of the date of issue. Now it is difficult, practically, to keep the loose-leaf books up to the minute. The bound volume idea, supplemented with reprints for those who do not need the complete volume, is worth pushing.

Mr. Gove's specification for a permanent secretary-engineer for the association is met in part at least by the circumstance that Executive-Secretary J. W. Welsh is an engineer by training and experience. When he was "Special Engineer" with the American Association, he acted as secretary of the Engineering Association. He will still remain an engineer and will consider matters from an engineering point of view, even with the title of secretary. While as executive-secretary he will have duties of a more general character than those which he performed as special engineer, he will be able to give engineering supervision to its proceedings. He can train some one to act as his deputy.

Finally, Mr. Gove made another important suggestion. This relates to the method of adopting standards, namely, that they be voted for on a "weighted" basis, the companies likely to be most affected having the greatest voting power. Mr. Gove quotes a precedent—the practice of the steam railroads as to certain standards. This scheme has much to recommend it but it would be complicated to apply to the electric roads. Conditions would be different if the use of standards was obligatory. Then, such a change might be necessary, but experience has shown so far that even those who vote for standards do not always adopt them.

The association should be grateful to Mr. Gove for his frankness in pointing out the spots in the organization which, after a year's presidency, he concluded needed improvement. Even if all of the details of his suggestions are not adopted, good has been accomplished by their suggestion. What is needed in any large body of specialists is the quality of alertness, the ability to sense the vital needs of an industry. This quality is illustrated in Mr. Gove's presidential address. Surely the association will note, assimilate and apply as many of his constructive comments as can at present be applied.

Bouquet Handed to Engineering Association Committee

A GOOD omen for the success of the coming year's work of the Engineering Association is furnished by the way in which the subjects committee has planned for the year's work. In the first place the committee conducted a considerable correspondence in advance, with a view to securing suggestions from qualified persons throughout the industry and the country. The response was gratifying. Then the committee held several meetings in advance of the convention and completed a tentative draft of a report. Every opportunity was given for advance consideration of the work for the coming year, President W. G. Gove's suggestion as to limiting the number of subjects to those most important being kept clearly in mind.

Then the committee placed the proposed assignments before the convention, inviting criticism. The effect of this procedure was at once apparent, especially as the assignments to the several committees were presented after the discussion of the reports of these committees respectively. If the committees next year are not satisfied with their assignments, surely they cannot hold the subjects committee responsible. Now, when the report of this committee goes to the executive committee for approval, the latter will know that nothing has been left undone to insure a good year's work.

The importance of early work in the assignment of subjects cannot be overestimated. On even such a low plane as the financial one, such work pays large dividends. In round numbers, say that 100 committee men will each devote 100 hours of working time next year to committee duty, at $5 per hour their time is worth $50,000. Assume that by careful planning 10 per cent of this time could be saved. The saving would be worth $5,000. It would, therefore, pay to spend a considerable amount in time and money to save this $5,000, which would be only one part of the real saving.

Engineering Judgment in Valuation Procedure

ENGINEERS should take to heart the recommendation of the valuation committee of the American Association that there be a more extended use of the so-called "yard-stick" method of valuation. The committee points out that this is the most constructive program for study by the incoming committee and urges the new committee to examine the subject with a view of ascertaining how best or to what extent the method can be given more general application. The ELECTRIC RAILWAY JOURNAL has urged this procedure in valuation but has recognized that it is not only a question for valuation engineers or executives but also for courts and commissions. Examples of the use of this method are not unknown, the most conspicuous example in electric railway circles being the recent valuation of the Connecticut Company, already related in these columns.

One of the principal points in such a method of valuation, it should be noticed, is a recognition of the judgment of the engineer as playing an increasingly important and deciding part in the making of valuations. It would take the engineer from the class of a clerical counter of field details and place him in the rôle of a judge of types of construction, depending upon him to decide what variations in type are negligible or compensating in the building up of intelligent costs of construction. In general, it is a step forward for the engineer in his coming into his own, and he should be ready to do his part in making the move a constructive one for the industries involved.

It must further be recognized, of course, that this is only a step; that the final object will never be realized until the commissions and courts recognize his judgment, to the extent that it must be utilized in yard-stick valuation, as competent testimony. That is, the integrity or usefulness of testimony as to value must be strengthened rather than vitiated by this method of arriving at the figures. It is up to the engineer to prove his value in this respect. The committee's recommendation, however, is a good omen.

The Question of Price Is Left Untouched

THE rest of the report of the committee on valuation this year is notable for two things—one, the excellent discussion on rate of return which should supply good arguments for companies in rate cases, and, two, the absence of any discussion on the main feature of the work of the 1919 and 1920 committee, namely, that of price. This, we believe, is unfortunate. In times of rising and high prices, it was easy and self-satisfying to urge the adoption of present-day prices in making inventory in appraisals. But the real work in the application of such a principle comes in the days of falling prices which must be admitted to be upon us—happily in most instances. The question of the base price to apply is one which presents more serious or debatable points than any other of the so-called tangible elements of valuation. Is it not logical that more constructive work should be done on it?

It is understood that in some of the companies now working up valuations of their properties, some very interesting and valuable experiments are being made to determine the effect of various pricing methods. This is a question in which the whole industry is interested, and it could be made one of the major subjects for the committee to work on. Because it is difficult is no reason to pass it up, but rather the best reason for attempting a solution. May next year's committee also consider this subject as a part of its work.

Bus Operators in the Amalgamated

NOTWITHSTANDING the fact that the association at its recent Atlantic City convention voted for the time being not to admit motor bus companies to membership, as was discussed in these columns last week, it was very evident from the remarks of many that the railways themselves are watching, analyzing or have actually established experimental bus lines as feeders in conjunction with their existing rail routes or as a supplement thereto.

That the employers do not for a minute underestimate the possibilities of the bus for exploitation services is aso evident from the action taken by the Amalgamated Association at its recent Atlanta (Ga.) convention. Perhaps the employees are one step ahead of the railway men in looking over future possibilities. Their action surely indicates that they want to get in on the ground floor, so to speak, and as the bus develops in usefulness to gain new and additional members.

Can it be their idea that the motorbus is to supplant existing electric railways or is it simply an evidence of the ever-reaching demand of labor to try to dictate in all new modes of transportation in somewhat the same manner it did when one-man cars were first put into service?

The safety car was a necessity on the part of the railway companies to preserve their integrity—thereby really retaining for the men their jobs. Now comes the bus for exploitation service—an entirely different proposition. If the Amalgamated Association attempts to foist upon the companies operating these vehicles unnecessary demands they can only open the way for the irresponsible operator to exist. The arguments advanced regarding the use of the safety car to preserve their jobs and keep more men at work cannot now be used, as this is an opportunity of work for additional men, and that is what is today being discussed at all unemployment conferences.

Many companies will recollect the difficulties that they experienced at the hands of the Amalgamated Association when the one-man car was first put into operation—the arguments regarding safety of operation, the safety of passengers, the extra work that would naturally devolve upon the operator and the 101 other fool ideas that the grievance committees brought up in arguing for a higher rate of pay for operators of this type of car.

These arguments after four or five years of continued operation have resulted in the companies' recognizing the operator to be worth about 10 per cent more than on either end of a two-man car. What will be the differential for motor-bus operators?

Changing Ideas in Regard to Car Painting

IT IS false economy not to keep cars well painted and extravagance to carry the painting process too far. This sentence sums up the philosophy of the subject as well as its economics. The statement may seem trite, but an examination of the paint shop practice of the industry will show that there is great diversity in the interpretation and practical application of the principle thus stated. In fact it may well be said that electric railways have swung from one extreme of an excessive regard for appearance to the opposite extreme of an excessive regard for cost.

Obviously the first requisite of good painting is to preserve the car structure, which means primarily protecting it from the elements. Almost any paint or varnish will serve this purpose for a time, but the practical question is: How long will the preservative effect last? This is matter to be determined by experience; every master painter has his convictions regarding it. Modern methods of paint testing will give a reasonably correct answer for a given climate.

But preservation is only one function of painting. The effect on the public is equally important. Each electric car is a traveling advertisement which is seen by multitudes every day. Its appearance either commends or condemns the management. This fact has always been appreciated, and in the early days, when paint and painters were cheap, car finish was frequently overdone. Much rubbing down was indulged in, with the idea of yielding a carriage or piano finish. Gold leaf was liberally used on lettering and striping. The artistic taste of the craftsman was allowed to display itself in ornate corner ornaments and the like. Now these luxuries have been discarded largely, which is right. But the tendency to go to the other extreme is not right. Such a type of painting should be used and such a program should be carried out that the cars will appeal to the public by virtue of their tasteful neatness.

In this connection an important lesson has been learned, namely, that a simple painting process can be made to yield results almost as good as the more elaborate ones of the past, that is, when judged by car finish rather than piano finish standards. A car does not require a superfine finish for several reasons: First, it is in general viewed from a distance. Then it is examined very casually and transiently; it is the general impression created that counts. Again, if the public gives the matter any conscious thought at all, it will favor economy in the interest of lower fares.

However, while painting need not and should not be elaborately done, it should be regularly done. It does not pay to allow much difference in the appearance of cars, because contrasts are conspicuous. A master mechanic once said to the writer, in criticism of the painting program of his predecessor: "He used to varnish the cars every year whether they needed it or not." Maybe they didn't need it every year, but much could be said in favor of the practice. And in this case the body color had been preserved for twenty years or more by the expedient of frequent varnishing.

The paint manufacturers of the country have been pushing the slogan "Save the Surface." Of course they have "an axe to grind," but the principle they are promulgating is right. It applies especially well to car painting, with the addition, "and Advertise the Service."

The Lubrication of Rolling Stock

Incidental Results of Improper Lubrication Far Reaching—Direct Cost of Lubricants a Small Proportion of Operating Expenses—Methods for Packing, Oiling and Inspecting Affected by Local Conditions—Typical Organizations for Securing Lubrication

By L. W. W. Morrow
Assistant Professor of Electrical Engineering, Yale University

IT TAKES oil and grease to lubricate the cars used on street railways; every one knows that fact. But how many railway operatives realize the importance of the subject of lubrication, and the absolute necessity for buying and applying lubricants on the basis of knowledge and not ignorance.

There really seems no one operating element that will pay better dividends than lubrication if studied seriously for the purpose of obtaining the tangible and intangible effects on the system's operation. Lubrication should not be dismissed by railway executives as an aggravating and unimportant element of operation which is best handled by purchasing the cheapest lubricants offered on a blanket bid and then function through the more or less able advice and work of oil company experts and unskilled labor.

The first cost of lubricants is the least important factor in lubrication; it pays to buy good lubricants, and the better the quality the higher the cost and the less quantity of lubricant needed. Poor lubricants applied in an improper manner may result in a final cost that will be the largest element in operating expenses with the exception of labor. Lubrication affects the wear and tear on all equipment, it affects the service reliability of the system and indirectly public sentiment, it affects the life and rate of depreciation of equipment, it is a fundamental element in shop, labor and maintenance costs, and analysis and study warrant the statement that it is one of the most important operating factors in the railway industry, yet has received the least attention of railway executives.

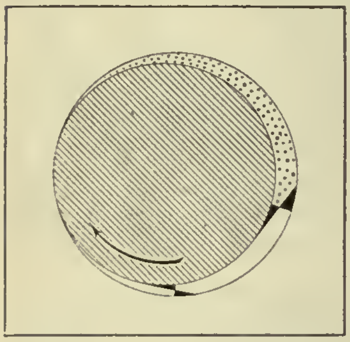


FIG. 1—OIL MOVES WITH ROTATING SHAFT

The rotating shaft tends to rotate the oil against the action of the bearing load.

The first cost and the quantity of lubricants used in the railway industry are difficult to determine; the following table shows an estimate for the yearly consumption and cost for the 90,000 motor cars and passenger trailers on electric railways in this country:

Lubricant	Quantity	Cost
Motor and compressor oil	1,600,000 gal.	$650,000
Gear grease or compound	600,000 lb.	265,000
Cup grease	150,000 lb.	15,000
Other lubricants	20,000 gal.	100,000

In 1920 the United States consumed over 500,000,000 bbl. of crude oil, so the railway consumption represents only about 0.02 of 1 per cent of the total oil consumption and a still smaller percentage of the total quantity of lubricants used by the country. The cost of these lubricants is not in excess of 0.1 of 1 per cent of the gross operating expenses of the industry.

In quantity and in cost, therefore, compared to national consumption and to other operating expenses, the item of lubrication is infinitesimal and not worthy of consideration. It is only because of the associated though intangible effects of lubrication on maintenance, service and operating methods that it is of importance and of interest to electric railway men.

Seemingly lubrication resolves itself into divisions relating to sale, purchase, storage and filling, systems of organization for oiling and packing and records and statistics to determine costs. Involved with these items from the standpoint of the railway operator are items such as reliability of service, cost of equipment, maintenance in relation to the cost of lubrication, effect of lubrication methods on rate and kind of depreciation on equipment, system inspection and labor costs and questions associated with public sentiment and relations.

The subject is very complicated and, depending on the viewpoint, may be approached from many angles. As one master mechanic says, "All troubles on rolling stock of a serious nature occur because of one of two reasons, improper lubrication or the overheating of the motors." As a traffic man states the problem:

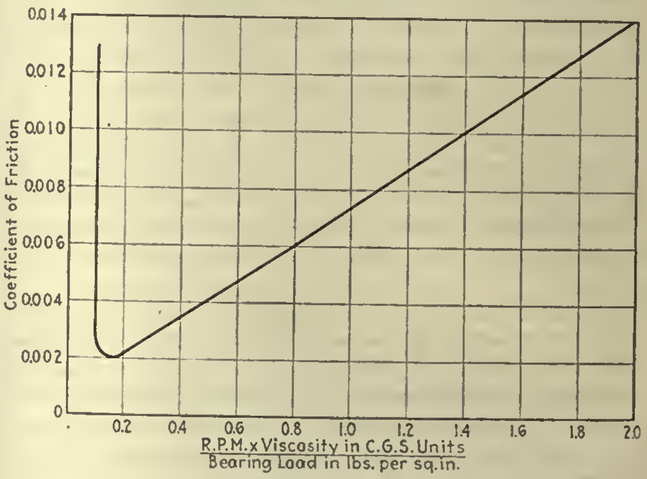


FIG. 2—CHARACTERISTIC CURVE FOR A RAILWAY BEARING

Test made in a Thurston machine. Shaft steel 3.97 in. in diameter, bearing, brass, 7.81 in. long, 3.31 in. chord of contact, 113 deg. arc of contact. Smooth surface, ungrooved cylinder, clearance 0.003 in. Loads 39, 135 and 155 pounds per square inch. Speeds 390, 230 and seizing speed from 15 to 50. Viscosities 0.5 to 0.15 C.G.S. Independent of load, speed and viscosity grouping all points fell on the curve.

"I want to give service and keep all the rolling stock in service; if my failure to do this is caused largely by breakdowns due to faulty lubrication, then my policy is to play absolutely safe and get the best possible lubricant applied in the best possible manner."

The production and sale of lubricants to the electric railways is a specialty business of small volume and requiring the services of expert lubricating engineers.

Very largely railway companies have purchased their lubricants on a guarantee cost basis whereby the oil company, after a detailed study of the system and its equipment, guarantees a maximum cost of lubrication per 1,000 car-miles and absorbs a cost in excess of this figure, while the railway company gets the benefit of any cost less than the guaranteed cost. The oil company furnishes experts and proper lubricants and the railway company supplies the men and the facilities for lubricating its equipment in conformity with the directions of the oil company experts. The oil company sells both service and lubricants to the railway company.

The other basis of sale and purchase is the gallonage basis. This basis dces not contain any guarantee clause fixing the cost per 1,000 car-miles, but fixes a contract price per gallon or pound of lubricant. The oil company supplies expert lubricating engineers free of charge who function as advisers to the railway operators.

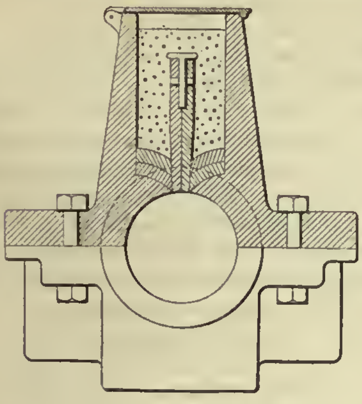


FIG. 3—GREASE CUP ARRANGED FOR OIL ON ARMATURE BEARING

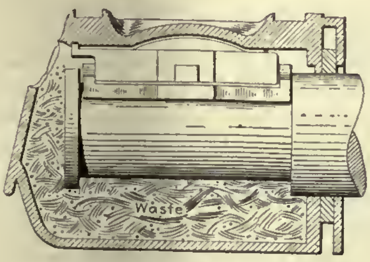


FIG. 4—SKETCH OF JOURNAL BOX AND PACKING

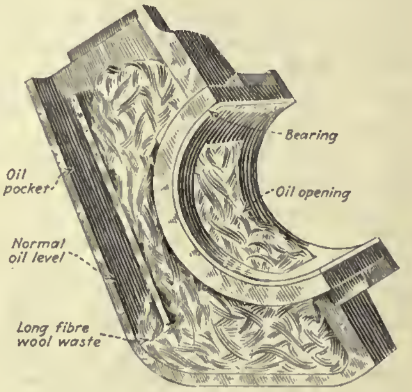


FIG. 5—SKETCH OF ARMATURE BEARING FOR SPLIT FRAME MOTOR

Some of the advantages claimed for the guarantee basis are:

1. The oil company sells service and not lubricants.

2. The maximum cost of lubrication for the ensuing year is a known item to the railway officials.

3. The railway gets the benefit of any saving obtained by keeping the cost below the guaranteed figure, while the oil company absorbs the excess. This statement must be modified when applied to those contracts which contain a clause which protects the oil company from any decided rise in the market price of oil.

4. The railway company has the services of lubricating engineers who strive to lower the cost of lubrication in order to increase their business by reducing the figure for the maximum guaranteed cost.

5. The railway company is relieved of managerial worry in regard to lubrication cost, methods or records.

Some of the advantages claimed for the gallonage basis are:

1. Lubricants are purchased on a purely quantitative basis at a figure fixed by the market price of oil.

2. The railway company is itself responsible for its lubrication and devises its system from the standpoint of efficient maintenance and service rather than lubrication cost.

3. Lubrication experts are available to the railway company who have no pecuniary incentive to advise the use of poor quality lubricants in too limited amounts.

4. The costs incidental to a detailed preliminary study of the system and its equipment are eliminated.

5. The oil company can devote its attention to the production of good lubricants—its business, and the railway company can devote its attention to the efficient operation of its equipment—its business.

Both systems of purchase have proved acceptable to railway operators and specific conditions and personal preferences usually decide the type of contract. As a general proposition, the purchasing agent desires to purchase all lubricants used by the railway company in all its operations from one company at the lowest price provided the grade of lubricants offered are satisfactory to the operating force.

The railway industry and the art of lubrication owes a great debt to the oil companies for the broad and helpful policies followed by their sales organizations and the expert technical services rendered by their lubricating engineers. It is a decided compliment to the oil companies to have an almost universal statement from foremen, oilers and master mechanics in railway shops to the effect that "those oil company engineers know what they are talking about and we follow their advice with confidence." The company experts are relied upon to specify the type of lubricant and its method of application to all the equipment. In addition, the company men and the railway men co-operate enthusiastically to secure improvements in both lubricating methods and lubricants.

After purchase, the next question asked is, How shall lubricants be stored? The storage of any lubricant is accompanied by fire hazards and a dry fireproof room is a primary requirement. The increased number of distributing centers and warehouses established by the oil companies and the financial situation of most railway properties has forced the trend of practice to the use of a small room suitable for the storage of only one month's supply of lubricant. This statement is modified by local conditions and there are many large, splendid oil storage rooms used by railway systems. The A. E. R. A. in the Engineering Manual, Bb 1a, gives a standard layout for an oil house.

Even with only a month's supply of lubricant questions arise in regard to equipment such as containers and filling apparatus. It pays to purchase and install adequate containers and adequate filling devices. Waste of oil is eliminated, and only one glance at certain oil rooms indicates how great the waste may be, the fire hazards are reduced, records are more accurate because measurements are reliable and the equipment adds to the system morale by improving the appearance of the plant and by creating pride in the oilers.

The use of lubricants on rolling stock is intimately associated with the history of electric railway equipment. Axles and car journals were adapted directly from steam railroad practice, but the electric motor with its armature bearings, gears, etc., introduced new elements into equipment design. The first tendency was to take the bearings and lubricating arrangements of the motor or generator as used in shops or power houses and adapt them to the street car. Alas! for the oil rings and reservoirs—they refused to function, so there followed a long and expensive series of changes in the lubrication methods and in the bearing design for the motors. One of the early systems used a detachable oil or grease cup—the cups got lost or were broken. Then followed a bearing which had a grease or oil receptacle cast integral with the bearing; there was no way to insure a supply of lubricant to the shaft. The next step was to use a hollow metal tube to conduct grease from a main supply to the bearing. The heat from the bearing was conducted by the tube to the grease and, melting the grease, correct lubrication would occur by reason of the automatic supply of melted grease; it failed to be automatic.

A type of bearing and a system of lubrication was then introduced for the motor journals which, in general, depended on a wick feed to the shaft from an oil reservoir. Felt was used as the wick and was arranged and formed in many ways, but the general principle was to hold one end of felt on the shaft under pressure and to hold the other end in the lubrication supply.

The next step was the use of journal boxes with waste for packing similar to those used on the car journals and, in spite of attempts to use ball bearings, ring oilers, roller bearings and other equipment for both motor bearings and axle bearings, this system is standard in American practice. In some one-man cars, however, ball bearings are used for both motor and axle journals, and in Europe several systems use this type of equipment.

The bearings and the system of lubrication on the latest equipment, as regards boxes and waste packing for axle, and motor armature journals represent all the changes and improvements that could be expected to follow from many years of experience and observation with many types of equipment under varied conditions of service. It seems crude in many ways and has some glaring faults, but it maintains its place as the best system and design for use from an economic and operating standpoint.

The lubrication of flat surfaces, gears and pinions has not changed materially in method and increased efficiency has been obtained by an improvement in the quality of the lubricant.

Wheel flange lubrication, as applied by apparatus on the moving vehicle, is used only on electric locomotives in America where it has proved very satisfactory as an agency to reduce the wear on tires or on rails located on curves.

THEORY OF LUBRICATION

The essential problem in lubrication is to maintain a film of lubricant between moving surfaces. If this film is not maintained heating, wear of parts and rapid deterioration occur. In the street car there are rolling contact surfaces in parts such as motor and axle bearings and in sliding contact surfaces in other locations such as side and center bearings. The maintenance of the film of lubricant depends on the condition and material of the friction surfaces, the pressure or bearing load on the surfaces, the contact velocity of the surfaces, the temperature of the surfaces and the lubricant, the viscosity, physical and chemical properties of the lubricant used and the method used to supply the lubricant to the surfaces. Many of these items can be controlled by the railway and oil company experts, but others are controlled by the service conditions to be met by the equipment and the design of the equipment.

A smooth surface permits smaller clearance between contact parts provided the design of the bearing permits the lubricant to be inserted at the proper places in sufficient quantity, but on motor bearings, for example, service conditions and reliability requirements cause the clearance to be larger than lubrication requires in order to allow no armatures to rub, alignments to change or other mishaps to occur under service operation.

FACTORS IN BEARING HEATING

The velocity of the contact surfaces both aids and prevents good lubricating conditions. A revolving journal, for example, gets covered with a thin film of oil and this oil film not only adheres to the journal as it rotates, but, due to its viscosity, carries around with it adjacent layers of oil and thus maintains lubrication. The higher the viscosity the greater this effect, but, on the other hand, the oil itself develops heat through molecular friction and this heat increases with an increase in the velocity and the viscosity, so that, unless the oil is cooled, the use of high velocity contact surfaces and of high viscosity oil will cause a decrease in the efficiency of lubrication because of the increase in the temperature.

The pressure between contact surfaces is detrimental to lubricating conditions since it pushes out the lubricant between the contact surfaces and decreases the thickness of the film. Designers of bearings care for this condition by inserting the lubricant on the contact surfaces where the bearing load is least, by utilizing the good features of velocity and by the use of lubricant having a high viscosity. The object is to get the lubricant to adhere to the contact surfaces and to supply more lubricant before the pressure breaks down the film or the lubricant is heated.

Lubricant of high viscosity is best to maintain a film under the adverse conditions of slow speed, high temperature and large bearing load, but, in general, the higher the viscosity the higher the first cost of the lubricant. Then again lubricant with a high viscosity develops more heat by molecular friction, requires greater clearances and is more difficult to handle but, in order to play safe and because viscosity decreases as the temperature increases, most operators demand a lubricant of high viscosity.

Lubricants may oxidize with age or heat, may gum, may evaporate, may be acid and cause corrosion, may emulsify or may "sludge," depending on the service conditions and the quality. But little criticism has been made of the lubricants used in the railway industry if used in sufficient quantity under prescribed conditions. Any criticism that arises is usually because the wrong type of lubricant was used on the specific job or because the lubricant was improperly applied to the contact surfaces.

As a theory and as regards the quality of the lubricants available, the lubrication situation is very satisfactory. The problem that remains and the one of the greatest importance to the railways is that of getting and maintaining lubricants of the correct quality on the friction surfaces at a minimum cost for time, labor and materials.

MANY PARTS TO LUBRICATE

Street cars have many parts that need lubrication and, since they are of many types, of various ages and have many different equipments, the following table is merely typical of the parts, the method of lubrication and the type of lubricant used:

Part	Method	Lubricant
Armature bearings................	Boxes and waste.....	Mineral oil
Axle bearings....................	Boxes and waste.....	Mineral oil
Journal bearings.................	Boxes and waste.....	Mineral oil
Gears and pinions................	Intermittent adhesion	Patent compounds
Compressor bearings..............	Splash.............	Mineral oil
Center and side bearings.........	Intermittent adhesion	Grease
Brake rigging....................	Intermittent adhesion	Grease
Brake cylinders, control and trolley equipment.....................	Intermittent adhesion	Vaseline
Trolley wheels...................	Intermittent adhesion	Sperm oil

In addition there are several parts such as air valves, equalizer bars, compression plates, door hinges and other mechanisms that require a small amount of lubricant at intervals.

Lubrication practice has not been reduced to a standardized basis even on an individual system, because it is impossible to find any system with uniform rolling stock of the same age and design and operating all cars under the same service conditions. An old car uses more lubricant than a new car. A suburban car uses more lubricant than a city car, because it usually operates at higher speed, is of different design, encounters rougher tracks and more frequently operates in water. These conditions result in a situation that requires intelligent supervision of lubrication on every railway system and makes impossible comparisons of lubrication costs on a 1,000 car-mile basis.

BEARINGS OF MANY TYPES

The most important parts of a car from a lubrication and service standpoint are the armature bearings, the axle bearings and the truck journal bearings. These bearings take the power and the hammer blows necessitated by service conditions, and a hot box on any one means a car out of commission. This results in a decrease in service and a direct cost of from $50 to $70 to remove the car, take out the bearings, put in a new bearing and to place the car back in service.

The method of lubrication for these bearings utilizes the journal box packed with waste which is soaked in oil. The general development of this type of bearing has been to have the waste packed on the side of the journal that is subject to the least bearing load while the oil is fed to the friction surfaces from the oil in the waste and in the reservoir through the action of capillary attraction. A supply of oil is retained in a well in the bottom of the bearing which can be gaged for depth and maintained at a constant level by use of the refilling tube which forms a part of the bearing.

Specific bearings differ very widely, however, not only in materials, arrangements and dimensions, but also in methods for securing adequate lubrication. Even on the same car the bearings and lubrication methods for the motor armature, driving axle and truck axle may differ materially.

On the motor armature bearings, for example, special precautions are necessary to prevent the oil from being thrown into the wrong channels, also care in design must be exercised to prevent commutator flashovers going through the bearing to the frame and causing pitting of the journal. Barriers, insulation and the use of interpole motors are used to relieve these conditions. Then again the bearings differ in material and clearances; the Brooklyn Rapid Transit Company uses solid bronze bearings on all its cars, because of their service requirement and the disadvantages of babbitted bearings from a service delay standpoint; the Public Service Railway of New Jersey uses solid bronze bearings for all axles, but the motor armature bearings have a $\frac{1}{8}$-in. liner of babbitt which is about 93 per cent tin. These changes were necessitated by the fact that track conditions were bad and caused hammer blows and shocks which caused the older type babbitted bearings to break and to depreciate rapidly. The liners in the motor armature bearings are necessitated by the difficulty of getting bearings to maintain an accurate fit to the motor journals. Some of the older type split-frame motor bearings must have their housings rebored every four or five years to maintain a correct alignment. The newer box type motors and pressure fitted bearings give no trouble from lack of alignment.

WASTE AND ITS FUNCTION

The waste used in armature, axle and journal bearings serves as a reservoir for lubricant and as a capillary agent for getting lubricant to the friction surfaces. Waste is made of long-strand wool, short-strand wool and some other material such as fiber. A typical bearing waste is 65 per cent long-strand wool, 35 per cent short-strand wool and 5 per cent fiber. The long strands in the wool waste take up oil from the oil well in the bottom of the bearing and bring it to the friction surfaces by capillary attraction. The long strands, however, permit but little oil to flow out from their circumferences and the short strands of wool are needed to afford "ends" which readily permit oil to flow on to the friction surfaces but have little storage capacity.

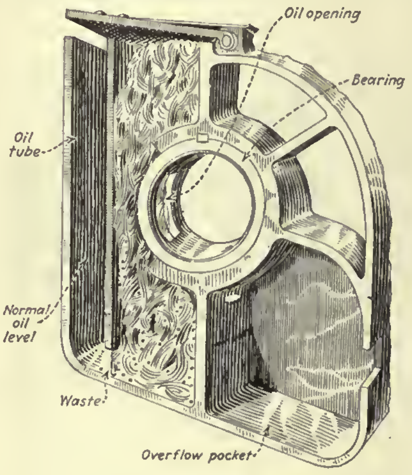


FIG. 6—SECTION OF MODERN AXLE BEARING CAP

When in operation, the jars and blows arising from track conditions have a tendency to compress the waste and cause it to shrink away from the friction surfaces. The fiber or other material in the waste is there to counteract this tendency by giving spring or resiliency to the packing.

When a car is in service the waste supplies a continually decreasing quantity of lubricant to the bearings, because it shrinks and glazes. Glazing results from the combined effect of frictional polishing of the waste and the action of the heated bearing on the oil and waste. Glazing destroys the capillary action of the waste and shortens its life. The better the grade of waste used and the better the quality of the lubricant the less the tendency for glazing to occur.

One grade of waste is generally used for all the bearings and its quality is determined by market prices.

During the war wool cost 85 cents per lb. as against 20 cents per lb. at present and, under the two price conditions, specifications for waste would differ.

Waste has a life of three or four years under ordinary service conditions. To prepare waste for use in bearings, it is picked apart and then soaked with oil for about twenty-four hours at a temperature of about 70 deg. F. The waste is drained for twenty-four to forty-eight hours and is then ready to use in a bearing. At the end of the drainage period a slight pressure of the hand should cause oil to exude and the waste should contain four or five pints of lubricant per pound of dry waste.

New waste is used in all motor armature bearings, but reclaimed waste can be used in other bearings. It is economical to schedule the waste in such a manner that it goes from motor armature bearings to driving axle bearings and then to the truck journal bearings. Between applications, the waste is always washed, picked apart, soaked and drained.

PACKING NOT STANDARDIZED

The present method of using waste as packing for motor, axle and journal bearings has some disadvantages from an operating standpoint, although it is the best method known. It involves the exercise of care and skill on the part of the oiler, yet the economics of the situation and the type of dirty work associated with the use of waste for packing result in the use of unskilled and often foreign or ignorant men as oilers and a tendency to a careless supervision on the part of the foreman and experts.

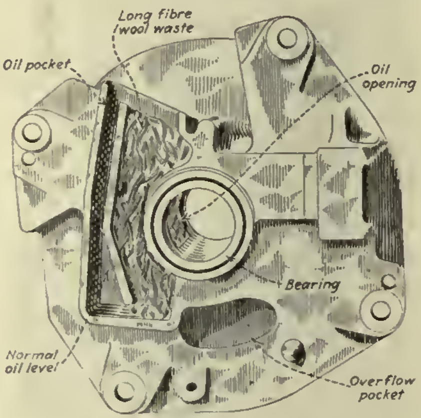


FIG. 7—MODERN SOLID FRAME ARMATURE BEARING

It is true that standard methods for preparing waste and for packing bearings have been developed as much as possible and the oilers have been trained to a rule of thumb standard of proficiency, but every time a bearing is packed there enters a necessity for the exercise of human intelligence and judgment inherent in the method and in its application to the equipment used in service. Bearings differ widely in packing space, end clearance, journal clearance, oil well arrangements and in dimensions and materials. Not all operating conditions or equipments are similar to those of the Capital Traction Company in Washington, which packs its journals, seals the boxes and lets them alone for about a year.

In packing the armature bearings it is the practice of some companies to press the waste firmly into the bottom of the housing, moderately tight opposite the opening in the bearing and with one large long roll of waste placed next the shaft and extending from the top to the bottom of the housing. More waste is then placed in the housing to add to the pressure and to keep the roll in contact with the shaft.

Motor axle bearings are packed solidly from the rear to the front while the truck journal bearings have a roll of waste packed against the dust guard with loose waste under the center of the journal and another roll in the front of the housing.

The proper supervision of the packing of bearings is very important. The degree of tightness or looseness, the arrangement of waste in the housing, the design of the bearing are all elements that require the expert or the foreman to supervise.

OILING AND GREASING

After bearings are packed, the maintenance of lubrication requires that oil be supplied at intervals. Also the compressors must be oiled at intervals, the gears and pinions lubricated and the side and center bearings greased. All these parts must remain in service between inspections and the failure of a lubricant supply will result in damage and a delay in service.

Today, as never before, the lubrication of equipment is essential. Economic pressure has caused the reduction of shop forces to a minimum, has put off the purchase of new equipment and has added to the duty of the old. The shop men, due to crowding, use less care in making and fitting bearings, the tracks give the bearings harder jars and the schedules give them greater loads to carry. An example of this condition is found in the fact that one company now makes armature bearings with 0.01 to 0.012 in. clearances while formerly it used 0.006 to 0.008 in. for clearances—this in spite of better inspection and more accurate gaging. One missed oiling or greasing may result in many direct and indirect costs to the system. It may put a car out of service, cause large repair costs, destroy a schedule and irritate the public.

The oil used in armature bearings, axle bearings and journal bearings is usually of one kind. This oil is changed, however, to conform to summer and winter operating conditions. No definite dates are fixed, but the time is fixed by the weather conditions. Compressor oil is of a better grade than bearing oil, but it also is changed to conform to winter and summer service.

In some ways the seasonal change of lubricant seems unfortunate because during the changeover periods many little troubles arise with equipment and men which have their origin in the cessation of routine lubricating practice. There are, however, so many good economic and lubricating features associated with the practice that the change is warranted.

The direct cost of lubricants is a small item, but the better the quality of the lubricant the greater its cost. However, the better the quality of the lubricant the less the quantity that needs to be used. A system that changes from lubricants of one quality to those of a better quality invariably finds it difficult to get the oilers to use less of the better lubricants.

The advantages to be gained in changing to a better quality of lubricant can only be obtained by carefully training the oilers and by exercising close supervision. Too frequently lubricants are wasted—in some shops the panacea for all equipment ills is a dose of oil and repair gangs dose motors and cars at every opportunity without any reference to the scheduled routine in lubrication.

Oilers try to maintain about 2.5 to 3 in. of oil in the armature axle and journal bearing reservoirs and fill the reservoirs as scheduled by means of the oil tube and a gill measure. It is frequently the practice for the oiler to "pick" the waste also and to see that the bearings are in good condition.

The lubrication of the gears and pinions requires the use of a heavy adhesive lubricant or compound. A supply of this rests in the gear case and touches the lower gear teeth. As the gears revolve the lubricant is carried around due to its adhesive qualities and functions to form a film between the contact surfaces. The chief requirement is that the compound be "sticky" and will not deteriorate in service operation. One company decreased its cost for gear compound from 69 to 49 cents per 1,000 car-miles by adding some resin to the compound and thereby improving its adhesive qualities. Gear compound is wasted by using too much in the gear case or by having loose or leaky gear cases. It is difficult to keep a tight gear case and the compound seems to find every opening.

Cup grease is used at intervals on the side and center bearings, equalizer bars, brake rigging and other slow and infrequently used contact surfaces. No particular skill is required and the only requirement is that such surfaces receive lubrication at proper intervals.

INSPECTION AND LUBRICATION

Lubrication and inspection occur on an 800-1,000-mile basis with most operating companies. At these intervals oil is added to the bearings and to the compressor and gear compound and cup grease are used if needed. Old and special equipment such as older type motors receive lubricant on a half inspection basis.

Other companies state that journal bearings should be lubricated once every thirty days if the cars make under 150 miles per day or, on a mileage basis, about every 4,500 miles. If the service is high speed, the cars making 300 to 500 miles per day, the bearings are lubricated weekly or about every 2,500 miles.

Another company cares for all lubrication by weekly inspection of all cars. The carhouse oilers add the quantities of lubricants needed. This company repacks bearings on interurban cars each three months, on semi-interurban cars each six months and on city cars each twelve months. All the work is done by daylight and the rules for repacking are subject to exceptions to suit special conditions and equipment.

Another company repacks on a car-mile basis—8,000 car-miles for motor and axle journals, 5,000 car-miles for pony axle journals. Still other systems repack at the annual overhauls unless any inspection period indicates a necessity for repacking.

One company uses about ¼ lb. of gear compound about every four weeks on each car and greases the side and center bearings, etc., with cup grease every five weeks. To save money a mixture of curve oil and kerosene is used temporarily to grease the side and center bearings when a hard rain brings about the need of lubrication at other than five-week periods.

ORGANIZATION

Organizations differ for handling lubrication. One typical method is to have an oiler to care for motor and compressor oiling and packing, another for journals and gears and a truckman to care for center and side bearings, etc.

These men are usually units in the inspection or repair gangs who have been trained by the lubricating engineer to do their jobs correctly. The foreman in each carhouse has general supervision of all work, including supervision. It does not pay to keep definite lubrication data in detail for each car in the offices, but some carhouse foremen have found it advantageous to keep records in the carhouse. These records immediately enable them to find what motor or compressor uses too much oil and the resultant investigation may ward off serious trouble with the equipment.

In general each carhouse foreman requisitions one month's supply of lubricants on a form which shows the amount of each type on hand at the end of the month, the amount used and the amount needed for the next month. This requisition, together with mileage and cost records, enables the office force or the oil company to compile unit costs of the form indicated below.

Carhouse Location 54th Street	Motor Oil	Compressor Oil	Gear Compound	Cup Grease	Total for June, 1921
Used	90 gal.	19 gal.	61 lb.	13 lb.	....
Cost	$29 70	$6 24	$3 36	$1 17	$40 47
Cost per 1,000 car-miles	$0 091	$0.019	$0.01	$0.003	$0.125
Mileage	323,340				

These unit costs serve to check each month's operation and can be studied profitably in connection with the monthly report of motor and car breakdowns. If any breakdown may have been caused by faulty lubrication a careful study can be made to determine the relation of lubrication to the trouble.

For example in May, 1921, out of 164 motor troubles on the Third Avenue Railway in New York seven breakdowns were due to worn bearings, one to a hot bearing and the large majority to grounded armatures or fields. The cause of the larger number of troubles might have been either lubrication or heat. Worn bearings might have caused armatures to drop or heat due to overloads and thus resulted in grounds. Hammer blows due to track corrugations or worn special trackwork might also have been contributory causes of trouble. Only a detailed study of the specific trouble could fix the cause, but lubrication is always a decided item in such a study. In the same month only two compressor troubles out of thirty-six could be attributed to lubrication. These two troubles were caused by leakage of oil through the housing.

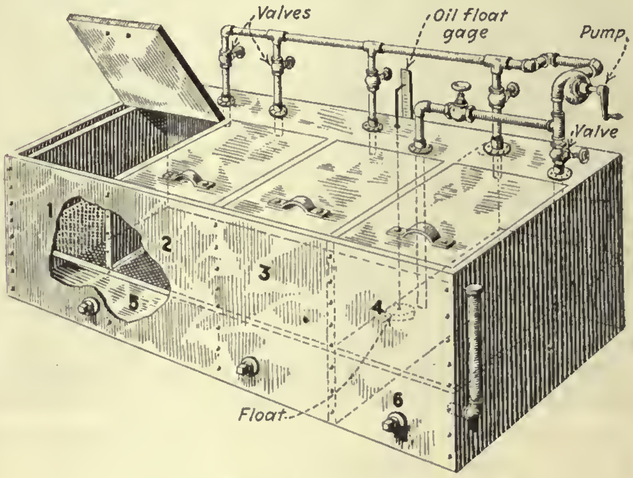


FIG. 8—WASTE SOAKING TANK

Dry waste is placed in sections 1, 2 and 3 and clean oil is pumped from section 5 to the waste sections. After soaking the oil is drained back to section 5. Sections 4 and 6 are used to re-soak old waste with reclaimed oil. Floats on tanks indicate oil levels and wire screens aid drainage.

CONCLUSION

Lubrication practice can never become standardized in the railway industry due to variations in equipment and service conditions and each system has its own problem of lubrication to be solved. An intelligent study of the lubrication problem on any system will result in decreased direct repair and lubricant costs and will secure better equipment and track maintenance and enable better service to be given. No radical changes in lubrication methods or lubricants may be expected to eliminate the necessity for managerial and technical attention to lubrication.

The chief improvements in lubrication methods should be the development of a system of lubrication that does not rely so much on the skill and care of the oiler and packer for its success and changes in methods of maintaining an oil film on friction parts by which such a film is kept uniform in thickness for longer periods of time.

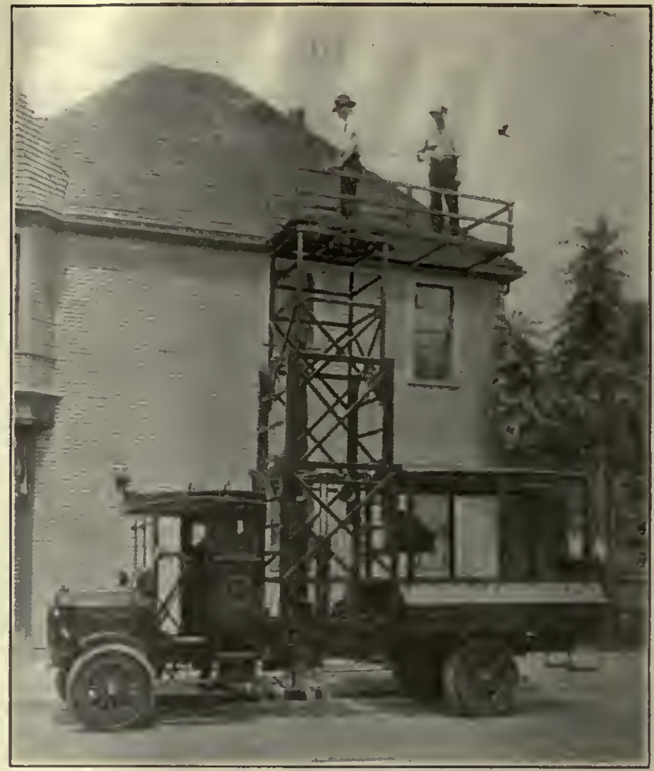
New Tower Truck for Detroit

Three-Section Tower Located Near the Center of the Body Can Be Raised or Lowered Either by Hydraulic Pressure or by Hand

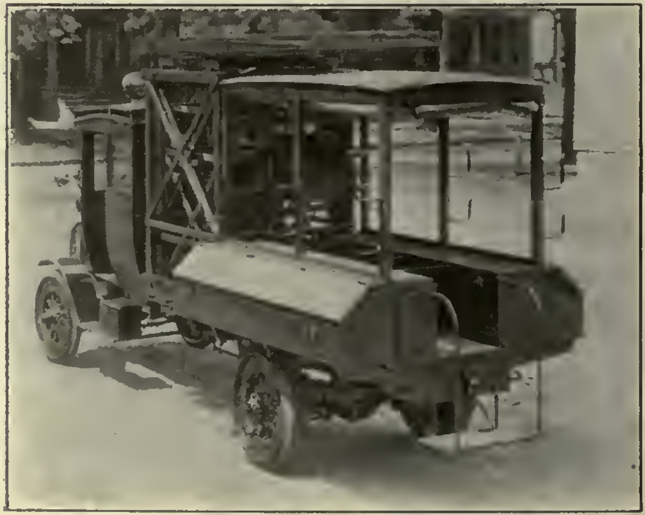
ACCOMPANYING illustrations show a trolley tower truck now being used by the Municipal Street Railways Department of the city of Detroit. It was built by the Standard Motor Truck Company and is the first of this type they have constructed. A three-section Trenton tower is located near the center of the body. The tower is operated by a Wood hydraulic hoist supported on two cross members in the center of the tower. The hydraulic hoist is hooked up with a hand hoist arrangement, so that in case of emergency or when the motor is not running the tower can be raised readily by one man turning a crank. The tower lowers by gravity and the hand arrangement is fitted with a brake to control the downward speed. The operating lever for raising the tower by hydraulic pressure is located within reach of the driver's seat. The tower can be elevated or lowered in less than a minute. The total height from the ground to the tower platform when elevated is 19 ft. 6 in.; when lowered it is 10 ft. 4 in.

The front portion of the truck is taken up with an inclosed cab. This has sliding doors and is fitted with an auxiliary roof so as to allow the workman to walk on it. A ladder shaped to the contour of the cab side is attached to provide a means of getting on to the tower platform.

The rear portion of the body is taken up by tool boxes and bins. There are four longitudinal tool boxes, two on the inside of the body running the full length and two outside ones. The inside tool boxes can be used as seats for workmen. The passageway between them has provisions for removable partitions so as to make four extra large compartments. The covers of the outside tool boxes are constructed on an angle so as to keep the contents dry in wet weather. A step and a hand rail at the rear end of the body make it easy for workmen to get tools and material from the inside tool boxes and compartments.


LINE TRUCK WITH TOWER RAISED

There are six double 8-in. hooks on each side of the car attached to the body posts. These are for use in hanging on coils of rope and wire. Curtains are provided at both sides and ends, so that the body can be completely inclosed in inclement weather. When not in use the curtains can be rolled up and attached to the top of the body. The chassis is equipped with a pintle hook and both front and rear tow hooks. Suitable electric lighting equipment is provided.


TOOL BOXES AND BINS ARE CONVENIENTLY LOCATED

TOWER TRUCK WITH CURTAINS LOWERED

Follow-Up System for Power Saving

A Description of Methods for Obtaining and Compiling Records, Together with the Various Cards and Forms Which Are Used on the Electric Railway Systems in Springfield and Worcester, Mass.

BY C. VERNER WOOD, JR.
Supervisor of Power Saving
Worcester Consolidated Street Railway, Worcester, Mass.

INSTALLATION OF RECORDERS IN VARIOUS TYPES OF CARS
At left, recorder in vestibule of safety car. At top, recorder in vestibule of standard city type car. At bottom, recorder in vestibule of electric freight car.

THE electric railway systems in Springfield and Worcester, Mass., have a total of 670 Arthur power-saving recorders in service at present. These have been in operation since July, 1919, in Springfield and since October, 1920, in Worcester. All freight cars of both companies have recently been equipped and records for these have been compiled since July. The type of recorder used registers the minutes of actual time that power is on.

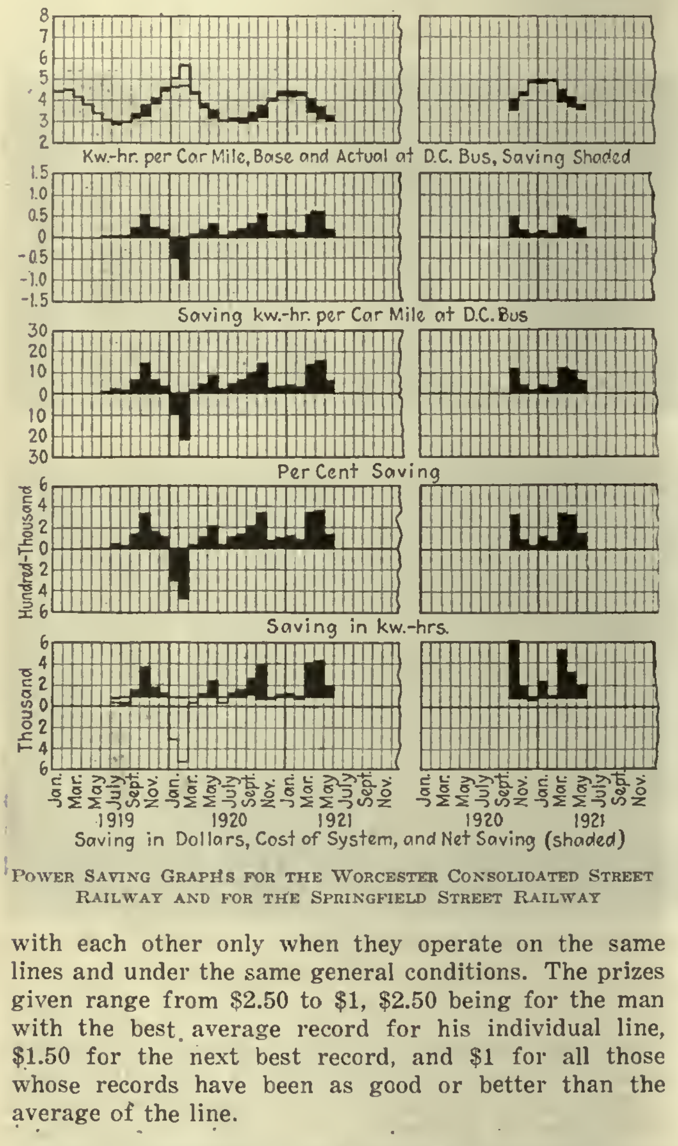
Accompanying illustrations show various record cards and forms used for collecting information and following up the operation. The record card used by the motormen is made of a medium-grade, gloss-finished cardboard. Its size is 5 x 8 in., which is the same as the register cards used on the system. At the top of the record card is a line for the car number, and below this are spaces for entering the motorman's name, badge number, date, run number and route. Each motorman as he takes out his car enters the reading of the recorder as he finds it, and opposite this he puts down the time.

Corresponding information is entered again on the card when the motorman leaves the car. With this system each man's record is checked with the next, and a great deal of care is given by each man to make certain that the "other fellow" doesn't make mistakes. Whenever any difference exists between the two men's readings a careful check is made to ascertain the reason. Printed on the back of this record card are a few suggestions for helping the motorman to improve his power-saving record. Sufficient space is also provided for reporting anything which may have caused the use of power unnecessarily.

CARDS ARE CHANGED EACH NIGHT

Each night the record cards are taken from the cars and new ones are substituted. In Worcester this work is done by the "register checkers" in connection with their regular work. In Springfield the work is done by spare crews using part of their time. The type of recorders used on these systems require winding and this is done twice each week. The same man does the winding that replaces the filled-out record cards with new ones.

All record cards removed are sent to the office of the power-saving department at Worcester, where they are checked and cut up. Each man's record is filed away until the end of a period covering two weeks service, then each man's card is figured and a statement is made up showing the various records. A copy of this statement is presented to each man. Six weeks time is designated as a "prize period," and at the end of this time each man's record for the previous six weeks is figured and a prize statement is drawn up. Men are compared with each other only when they operate on the same lines and under the same general conditions. The prizes given range from $2.50 to $1, $2.50 being for the man with the best average record for his individual line, $1.50 for the next best record, and $1 for all those whose records have been as good or better than the average of the line.



POWER SAVING GRAPHS FOR THE WORCESTER CONSOLIDATED STREET RAILWAY AND FOR THE SPRINGFIELD STREET RAILWAY

WORK DONE BY POWER-SAVING INSPECTORS

A power-saving inspector is employed by each company whose duties consist of instructing the motormen as to how to operate properly and also making small repairs and adjustments as they are necessary to the recorder. The results obtained depend to a large extent on the ability of this man, as he forms the point of contact between the company and the men, and his work should be to encourage the good motormen to continue and to assist the others to try harder. This inspector also looks over the record cards each day to learn what cars are reported as poor coasters and to ascertain if all the recorders are working properly. Another form shown in the accompanying illustration is the report blank used by the power-saving inspector for recording observations as he rides on the various cars. On this form are entered the motorman ridden with, operating points noted and the number of seconds required by the motorman to feed his controller to the full parallel position. These daily reports are summarized every two weeks; that is, the names of the motormen who seem to disregard some of the essential requirements for efficient operation are copied off and sent to the division superintendent, who calls these men in to caution and to ask them to do better. It is found that a greater measure of success is obtained by constantly keeping "power saving" before the men and teaching them that the new manner of operation is safer and easier than the old. It is not expected that all men will be as efficient as some, but it is expected that each man will do his best. On the whole the men have entered into power saving with a great deal of spirit and the rivalry on most of the lines is quite intense.

POWER-SAVING COST FURNISHED EACH MONTH

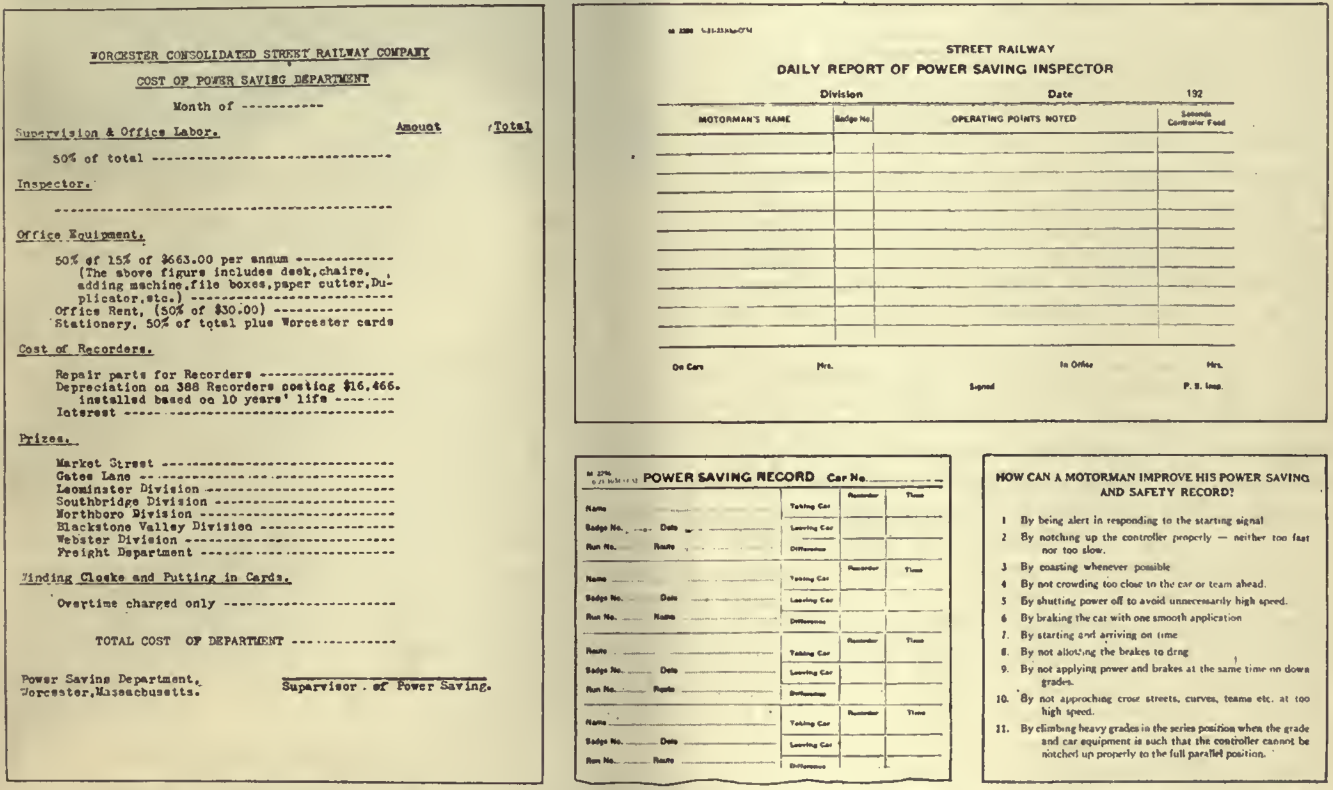
At the end of each month a statement is sent to the various offices of each company showing the cost of the power-saving department during that month. An accompanying illustration shows the form that this report takes. The costs which enter into this report include office labor, salary of power-saving inspectors, cost for office equipment, stationery used, including record cards, repair parts used for the recorders, depreciation on the recorders, interest on the investment, cost of winding the recorders and placing record cards in the cars, and the amount of prize money given out. Our cost for office labor is very reasonable as the total force required to take care of the clerical labor for both companies consists of but two clerks and a stenographer. Blueprints of power-saving graphs of the form shown in two of the accompanying illustrations are sent out with this report. These show the kilowatt-hours per car-mile, the saving in kilowatt-hours per car-mile, the per cent of saving in kilowatt-hours, the saving in dollars, the cost of the system and the net saving. These graphs are arranged to cover a period of five years by months, each month's information being added as it is worked up. This method of keeping the record enables a ready comparison to be made for each one of the important facts entering into the problem.

In figuring the saving made it is not deemed accurate to compare directly the kilowatt-hours per car-mile used from month to month with the corresponding months of the year previous to the installation of the power-saving recorders because of the fact that certain improvements have been instituted which in themselves have produced a saving in power. Also there may be a difference in the number of passengers carried and the schedule speed, which would make a difference in the amount of power consumed. Therefore, a so-called "bogey kilowatt-hour per car-mile" is put into use based on the performance dating back to June, 1918. An adjustment is made on the bogey year with allowance for conditions of the current month as regards schedule speed and average passengers carried per car-mile. Also the estimated saving of power made by the use of lightweight safety cars.

LOW MAINTENANCE FOR RECORDERS

The cost of maintaining the recorders thus far has been exceedingly low. It is planned to give each recorder of both properties a thorough overhauling once each year. All recorders on the Springfield Street Railway were gone over last fall, and will be due for another examination and cleaning this fall. The Worcester recorders will have their first overhauling this fall. It has not been found necessary to employ additional help for doing this work as the power-saving inspector is able to do it along with his other work. The only part of the recorder requiring much attention while cleaning is the clock movement. To carry out the necessary work ten movements are removed from the open cars which are laid up during the winter months. These recorders are soaked in gasoline. If they are extremely dirty they are brushed with a small brush dipped in gasoline, and then they are allowed to dry thoroughly and a drop of clock oil is put on each bearing surface. After this overhauling these ten movements are substituted for a like number of movements taken from recorders in service, and these in turn are cleaned and oiled. This procedure is continued until all recorders have been properly overhauled. Sometimes the change of movement is made on cars while they are in service, as but ten minutes is necessary to remove a movement and substitute another. The soaking of the movement in gasoline requires but half an hour, unless it is extremely dirty. Any clock movement found out of adjustment or with broken parts is sent to a jeweler for repair. The average cost of such repairs to movements thus far has been about $1. All other parts of recorders have given very little trouble and very few repairs have been necessary. A small stock of supplies is kept on hand and upon failure of any part of the recorder it is replaced by the power-saving inspector.

Since the date of installation of the recorders in Springfield up to May 31, 1921, all costs resulting from their operation, including interest and depreciation, amount to $17,500. The gross saving, which is considered to be figured very conservatively, amounts to $34,700. This leaves a net saving of $17,200. In Worcester from October, 1920, to May 31, 1921, the total costs amount to $7,100, while the gross saving is estimated at $23,700. This leaves a net saving of about $16,600. One of the reasons for the Worcester system showing a greater amount of net for a shorter period of time is that the cost of power in Worcester per kilowatt-hour is considerably more. It has been found that, aside from the actual saving made in power by the use of the recorders, many savings which cannot readily be estimated result. These include the saving in electrical equipment, brake shoes, etc., and also the saving resulting from fewer accidents, as it has been found that the use of the recorders encourages carefulness and thus in many instances avoids accidents.



WORCESTER CONSOLIDATED STREET RAILWAY COMPANY

COST OF POWER SAVING DEPARTMENT

Month of -----------

Supervision & Office Labor. Amount Total

50% of total ----------------------------------

Inspector.

Office Equipment.

50% of 15% of $663.00 per annum -------------
(The above figure includes desk, chairs, adding machine, file boxes, paper cutter, Duplicator, etc.) ---------------------------
Office Rent, (50% of $30.00) ----------------
Stationery, 50% of total plus Worcester cards

Cost of Recorders.

Repair parts for Recorders -----------------
Depreciation on 388 Recorders costing $16,466. installed based on 10 years' life --------
Interest --------------------------------

Prizes.

Market Street ----------------------------
Gates Lane ------------------------------
Leominster Division ---------------------
Southbridge Division --------------------
Northboro Division ----------------------
Blackstone Valley Division --------------
Webster Division ------------------------
Freight Department ----------------------

Winding Clocks and Putting in Cards.

Overtime charged only ----------------------

TOTAL COST OF DEPARTMENT --------------

Power Saving Department,
Worcester, Massachusetts.

Supervisor of Power Saving.

STREET RAILWAY

DAILY REPORT OF POWER SAVING INSPECTOR

Division Date 192

MOTORMAN'S NAME	Badge No.	OPERATING POINTS NOTED	Seconds Controller Feed

On Cars Hrs. In Office Hrs.

Signed P. S. Insp.

POWER SAVING RECORD Car No.

		Recorder	Time
Name	Taking Car		
Badge No. Date	Leaving Car		
Run No. Route	Difference		
		Recorder	Time
Name	Taking Car		
Badge No. Date	Leaving Car		
Run No. Route	Difference		
		Recorder	Time
Route	Taking Car		
Badge No. Date	Leaving Car		
Run No. Route	Difference		
		Recorder	Time
Name	Taking Car		
Badge No. Date	Leaving Car		
Run No. Route	Difference		

HOW CAN A MOTORMAN IMPROVE HIS POWER SAVING AND SAFETY RECORD?

1 By being alert in responding to the starting signal
2 By notching up the controller properly — neither too fast nor too slow.
3 By coasting whenever possible
4 By not crowding too close to the car or team ahead.
5 By shutting power off to avoid unnecessarily high speed.
6 By braking the car with one smooth application
7. By starting and arriving on time
8. By not allowing the brakes to drag
9. By not applying power and brakes at the same time on down grades.
10. By not approching cross streets, curves, teams etc. at too high speed.
11. By climbing heavy grades in the series position when the grade and car equipment is such that the controller cannot be notched up properly to the full parallel position.

AT LEFT, FORM OF MONTHLY REPORT OF COST FOR POWER SAVING DEPARTMENT. TOP, RIGHT, FORM FOR DAILY REPORT OF POWER SAVING INSPECTOR. BOTTOM, FRONT AND REVERSE SIDES OF POWER SAVING RECORD CARD.

New Skip-Stop Signs for Chicago

SKIP-STOP locations are being painted on 16,000 poles at 8,000 stops in Chicago, the work requiring about five weeks time. Heretofore stop signs hung on the cross-span wires have been used, but there has been some complaint that they could not be seen, particularly at night. An effort was made to speed up the painting of the poles for the new stop signs in order to serve the large number of visitors present in the city for the Pegeant of Progress. The new sign is painted with two coats of white paint on the black tubular steel poles with the inscription "Cars Stop Here" in black letters. It is believed that the new stop signs will be much more readily visible at night. The cross-span signs will be taken down. In addition to the fact that they could not be seen well, they have also proved somewhat unsatisfactory since the swinging in the wind finally wears out the wire supports and the signs drop to the ground. While no injuries have resulted from this, it represents a danger which was a factor in the decision for their removal.

On three streets the company has center pole construction and in order to minimize the danger of automobiles hitting these poles they are all being painted with orange and black stripes.

How the Equipment Man Can Aid in Reducing Costs

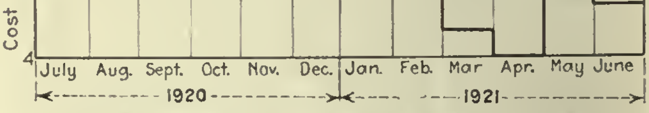
Competition Demands Lowest Possible Car Maintenance Costs, Which May Be Accomplished Through a Close Supervision of Every Detail—Suggestions Given on How Costs May Be Reduced and Interest of Shopmen Increased

By Pierre V. C. See
Superintendent of Equipment Northern Ohio Traction & Light Company, Akron, Ohio

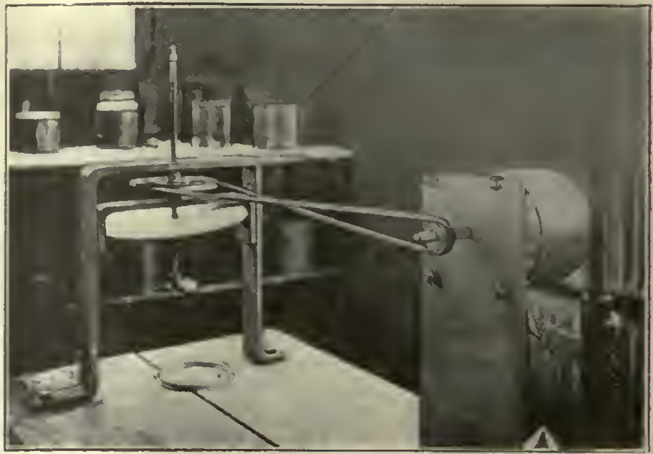
When jitney and motor bus first appeared railway men generally thought they would not be able to compete with the street car and interurban. Maintenance costs, operating expenses and depreciation would soon put them out of commission. It is undoubtedly true that the electric car can be operated more cheaply than the automobile, but we find in many cities that the jitney and bus are still flourishing.

The problem brought before the electric railway by the continued reality of these competitors is to operate at a low enough cost to enable a rate of fare which will discourage if not prohibit such competition. Although the car equipment cost is a comparatively small part of the total expenses of a road, under the circumstances it is essential that car maintenance be reduced as low as possible without incurring deferred maintenance that will ultimately mean greater outlay This is how the master mechanic can best help in merchandising car rides, assuming, of course, that he is keeping the cars in such order as to appear clean and avoid breakdown.

To obtain the minimum shop costs consistent with safe, clean and reliable service requires close following of every detail that goes into the maintenance of cars and shops. The results of a campaign in our shops to reduce the costs of car maintenance are shown in the accompanying curve, where it is seen that the average cost per car-mile was reduced from $0.642 to $0.475. During this period there was a 25 per cent reduction in cost of labor, but practically none in the cost of material, as the old stock bought at the high price period was still being used. This reduction in car maintenance cost was accomplished in spite of a considerable reduction in the mileage. In making this saving the number of men and the length of the working day were cut to the lowest possible point and all overtime was stopped. The reduction in men automatically made a corresponding reduction in the material used. The material reduction was also further followed up and only absolute necessities were drawn from the stores.



Curve Showing Reduction in Equipment Maintenance Cost Due to Increased Efficiency in Akron Shops of N. O. T. & L. Co.



Paint-Mixing Machine, Motor Driven, Which Is a Great Labor-Saving Device

The largest single item of expense is labor. A good means of watching this item of cost is a frequent careful analysis of the shop forces so as to determine exactly the necessity for each man employed. This analysis should be compared with previous similar analyses from time to time, to determine what change in the force in each department is being made. A sample form of such a man-hour check-up sheet is shown herewith. This is made on thin drawing paper so that blueprints can be made and given to the foremen for their guidance. The last column shows each supervisor the number of men he is supposed to carry. A check against this chart can be made daily or weekly by the clerical force.

Chance for Waste in Car Cleaning

The cleaning of cars is an item that may run into considerable money and, to a great extent, the cleanliness of the cars is proportionate to the money expended. On the other hand, there is probably no other class of work that has such a tendency to deteriorate and become humdrum. The best of car cleaning systems if not followed up by the supervising force soon deteriorates and the foreman, or "straw boss," feels that his work is not of importance and is only a daily routine. If he gets that attitude it quickly permeates the entire car-cleaning gang.

In order to keep these forces up to the highest degree of efficiency the car cleaning must receive frequent inspection and criticism. The testing of new materials, even though they may be no better than what is being used, has a tendency to arouse interest on the part of the men. But whatever cleaning material is used, care must be taken that the least possible damage to the varnish and enamel is involved.

Piece work or bonus systems, where they can be used, result in a very material speeding up of the shop work, but unless the inspection of the work is very rigid the man will increase his output at the expense of the quality of his work, until it becomes necessary to limit the amount of work he is permitted to do in a day. This in turn practically nullifies the advantages of the piecework.

Lubrication and brake shoes are two items of expense that most roads are following closely in monthly statements. The reduction of the oiling to as low a point as possible is a good plan not only from the standpoint of economy but in preserving general cleanliness of the shops and roadway. In attempting to lower the oil consumption, however, it should always be borne in mind that a very few hot bearings due to lack of oil will more than offset any saving made in oil costs. So the greatest care must be taken to determine how far economizing in this direction should be carried.

The reduction of the brake-shoe cost must be followed up from several angles. The truck maintenance must be kept up so as to prevent shoes wearing crooked and running off the wheels. The inspection force may also make a big saving by the proper adjustment of brakes and by reversing shoes that are wearing heavily at one end. The changing of shoes from motor to trailer wheels may often help, while a frequent inspection of the scrap brake shoe pile and a return to the inspection shop of shoes not worn out will also have a good effect on the cost. The selection of the proper material for the brake shoes to give the greatest coefficient of friction and longest life without cutting the wheels is also necessary.

GOOD AND BAD PAINT ECONOMY

Painting is sometimes considered as being in the luxury class and in the days of gold stripes on the trucks and fancy figures on the headlinings it probably could be properly so classed. But with the modern, thin, sheet-metal sides and light pressed posts the coating of this metal with paint is an absolute necessity. It is far cheaper to maintain a film of paint than to allow the metal to rust, making it necessary to scrape, sand blast and at times replace the pitted metal when the delayed painting is finally undertaken.

The question of the relative economy of flat colors and varnish, color varnish or the straight enamel system is still open to considerable discussion. The use of the varnish makes a more flexible system. If the varnished car can be brought to the shop before the varnish has perished, it can be touched up and revarnished at a very reasonable cost. The amount of striping and lettering that is done on a car is a matter of personal taste, but it should be borne in mind that the cost of this work is high and if the money thus put out were spent in covering more cars the average appearance of the equipment would probably be better.

If ready-mixed paints are allowed to stand in the cans for any length of time the pigment usually settles out and requires considerable labor to get it properly stirred up. An electric driven propeller, shown in the accompanying picture, has been found to be a great labor saver as it will stir up the hardest paint or putty in a comparatively short time. This machine can easily be made in any shop from materials on hand.

The attached curves show the number of armatures wound and repaired during the last two years. The great reduction in the number of armatures rewound was obtained by introducing a systematic oiling, which reduced the number of hot armature bearings, and by a closer checking of the motor clearance, which practically did away with bands being torn off the armatures, necessitating their rewinding. Putting into service new cars with modern motors and a lower gear ratio, the mild winter, the closing of ventilated motors during the snowy winter weather, improvement in methods of winding, insulating and baking of armatures so as to do the work in the most modern way, and a thorough cleaning up of the armature room, all contributed to this better armature record.

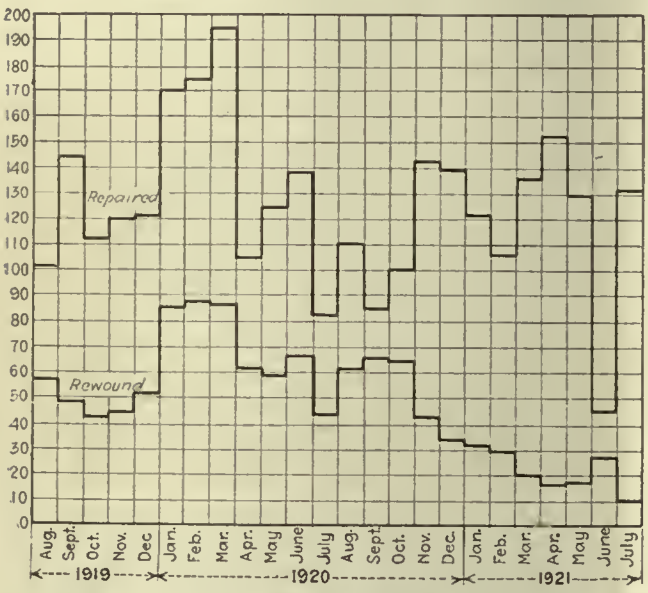
MAN-HOUR COMPARISON

Day Cuyahoga Falls	July, 1920		August, 1920		November, 1920		January, 1921		March, 1921	
	Number of Men	Hours	Number of Men	Hours	Number of Men	Hours	Number of Men	Hours	Number of Men	Hours
General foreman	1	11	1	11	1	10	1	10	1	10
Carpenters	3	30	3	30	3	27	3	27	3	27
Electrician	4	40	4	40	4	36	4	36	4	36
Truck department inspector	8	80	6	60	6	54	5	45	5	45
Machinist	1	10	1	10	1	9	1	9	1	9
Armature pit	2	20	1	10	1	9	..	...	..	...
Air department	3	30	3	30	3	27	2	18	2	18
Sprinkler inspector	1	10	1	10	1	9	1	9	1	9
Blacksmith	1	10	1	10	1	9	1	9	1	9
Boiler fireman	...	...	..	...	1	12	1	12	1	12
Stove repair	2	20	2	20	2	18	..	...	..	...
Car firemen	...	...	..	...	1	11	1	11	1	11
Headlight-trolley	1	10	1	10	1	9	1	9	1	9
Barn sweeper and yard	1	10	1	10	1	9	1	9	1	9
Sand and coal	1	10	..	...	..	...	1	9	1	9
Car cleaners	8	40	5	40	7	63	5	45	5	45
Cleveland inspectors	...	...	..	...	1	11	1	11	1	11
Cleveland car cleaners	...	...	..	...	2	18	2	18	2	18
Water boy	1	12	1	12	..	...	..	...	..	...
Club room janitor	1	12	1	12	..	...	..	...	..	...
Motor inspector	...	...	..	...	..	...	1	9	1	...
Total	39	355	32	315	37	341	32	296	32	296

Night Cuyaboga Falls	July, 1920		August, 1920		November, 1920		January, 1921		March, 1921	
	Number of Men	Hours	Number of Men	Hours	Number of Men	Hours	Number of Men	Hours	Number of Men	Hours
Foreman	1	12	1	12	1	11	1	11	1	11
Carpenter	1	12	1	12	1	11	1	11	1	11
Motor inspector	1	12	1	12	1	11	1	11	1	11
Truck and brake inspector	3	36	3	36	3	33	2	33	2	32
Car oilers	2	24	2	24	2	22	2	22	2	22
Sand and coal	1	12	1	12	1	11	1	11	1	11
Car fireman	...	...	..	...	2	22	2	22	1	11
Boiler fireman	...	...	..	...	1	12	1	12	1	12
Headlight repairman	1	12	1	12	1	11	1	11	1	11
Trolley repairman	1	12	1	12	1	11	1	11	1	11
Car cleaners	4	48	4	48	4	44	4	44	4	44
Watchman	1	12	1	12	1	12	1	12	1	12
Total	16	192	16	192	19	211	19	211	17	189
Grand total	55	547	48	507	56	552	51	507	49	485

The value of the acetylene cutting torch and the electric arc welder in shop work can hardly be overestimated. A portable acetylene outfit will make a large saving by using it to cut off loose truck bolts and rivets, while the carbide generator and piping is a great help to the blacksmith and machine shops for cutting out special shapes such as brake levers and hangers.

The use of an electric welder, or "putting-on tool," as it has been aptly called, results in economies in innumerable ways. The welding of broken truck frames, armature cases, gear cases and the building up of brake levers, motor housings, armature shafts and truck parts all produce economies that may easily be figured out in dollars and cents by keeping account of the labor and material and comparing them with the cost of new parts. A consulting engineer who makes a business of inspecting electric roads said that he always judged the efficiency of the shop by the condition of the scrap pile.



IMPROVEMENT IN AMOUNT OF ARMATURE WORK DUE TO BETTER OILING OF BEARINGS AND BETTER ELECTRICAL REPAIR METHODS, NEW MOTORS, ETC.

Standardization has been the millennial dream of the master mechanic, but only a very few roads are fortunate enough to approach this goal. An example of the result of non-standardization is found in the item of car windows. Some 200 different sizes of windows are known to exist on a single road. This requires that twenty or thirty different sizes of glass be carried in stock. If these window sizes were in even inches, so that the glass could be taken directly from the boxes without cutting, a great saving in labor and broken glass could be effected and also a much smaller amount of money need be invested in stores. This same saving would result to a greater or less extent from standardizing any car part, but where cars have been purchased at different times and in a great variety, the cost of standardizing this equipment runs into a discouraging sum of money. A careful analysis should be made, however, to see what can be done toward standardizing cars when they are rebuilt, in case of smashed ends or upon general overhauling.

It may not appear that shop and yard cleanliness has any particular bearing on the economy of maintenance, but a dirty shop means that there is considerable time lost by workmen in stepping over and around material and in looking for tools and car parts. Whitewashed walls and ceilings will often double the amount of light in a shop and correspondingly improve the efficiency of the shop work.

Unemployment Conference Makes General Recommendation

WITHOUT attempting the impossible task of assessing the relative weight of different forces, the Conference on Unemployment now meeting at Washington under government auspices has made the following summary of the more important matters that require constructive and immediate settlement if recovery in business and permanent employment are to be speedily brought about:

1. Readjustment of railway rates to a fairer basis of the relative value of commodities, with specal consideration of the rates upon primary commodities, at the same time safeguarding the financial stability of the railways.
2. Speedy completion of the tax bill with the contemplated reduction of taxes, in order that business now held back pending definite determination may proceed.
3. Definite settlement of tariff legislation in order that business may determine its future conduct and policies.
4. Settlement of the financial relationships between the government and the railways, having in mind the immediate necessity for increased maintenance and betterments, making effective increased railway employment and stimulation of general employment, in order that the railways may be prepared for enlarged business as it comes.
5. Limitation of world armament and consequent increase of tranquility and further decrease of the tax burden not only of the United States but of other countries.
6. Steps looking to the minimizing of fluctuations in exchange, because recovery from the great slump in exports (due to the economic situation in Europe) cannot make substantial progress so long as extravagant daily fluctuations continue in foreign exchange, for no merchant can determine the delivery cost of any international shipment.
7. Definite programs of action that will lead to elimination of waste and more regular employment in seasonal and intermittent industries, notably in the coal industry, in order that the drain upon capital may be lessened and the annual income of workers may be increased.
8. In the field of all the different industries and occupations the rapidity of recovery will depend greatly upon the speed of proportionate adjustment of the inequalities in deflation.

Appended to the summary is a large table of approximate index numbers based on 100 for the year 1913. The report says about these that "If the buying power of the different elements of the community is to be restored, then these elements must reach nearly a relative plane." Out of the large number of index numbers given, the following are quoted as of immediate interest to railways:

Cost of living:	
Department of Labor (May survey)	180
National Industrial Conference Board	165
Average price to producer, farm crops	109
Average price to producer, live stock	113
Average wholesale price, foods	152
Average retail price, foods	155
Construction costs: Cement buildings (Aberthaw Const. Co.)	161
Coal:	
Price, bituminous, Pittsburgh	186
Price, anthracite, New York tidewater	198
Union wage scales about	173
Non-union scale, about	136
Freight rates	187-209
Metal trades, union wage scale: Simple average, 19 occupations	218
Metals:	
Prices—	
Pig iron, foundry No. 2 Northern (Pittsburgh)	137
Pig iron, Bessemer	128
Steel billets, Bessemer (Pittsburgh)	115
Copper, ingots electrolytic, early delivery, New York	75
Lead, pig, desilvered, for early delivery, New York	100
Zinc, pig (spelter), Western, early delivery, New York	80
Day labor, scale U. S. Steel Corporation	150
Railroad, average receipts per ton-mile	177
Bureau Railway Economies estimate of railway wages based on average annual compensation, third quarter	226
General estimate all union wage scales by Prof. Wolman	189

Note—The wage indexes refer mostly to wage scales, not the earnings which necessarily also depend upon regularity of employment.

Overhead Kinks from Cleveland

Two Schemes for Eliminating Half the Usual Number of Poles in Successful Use—Some Temporary Construction Schemes Described—A Movable Track Including Overhead for Car Unloading Dump

INGENUITY and James Scott, for many years superintendent of overhead Cleveland Railway, seem to work well together. In the issues of ELECTRIC RAILWAY JOURNAL for July 14 and July 21, 1917, there were presented a number of overhead construction and maintenance kinks and new ideas in overhead equipment design that had been worked out by Mr. Scott. Herewith is another grist of ideas and kinks from the same source.

When a track is under reconstruction in Cleveland, it is the practice to lay a temporary track on top of the pavement along one side of the street, in order to keep the cars running in both directions without the limitations of single-track operation. For the temporary trolley over this track, Mr. Scott is now using $\frac{3}{8}$-in standard steel span wire instead of copper wire, because it is easier to put up and take down, it remains tight and has less sag than copper, and saves cutting up the more expensive copper trolley wire.

OVERHEAD BUILT BY THE CLEVELAND RAILWAY TO BE SHIFTED WITH TRACK AT DUMP

AN INSTANCE OF OVERHEAD CONSTRUCTION USED WHERE BUILDING WAS TOO CLOSE TO CURB TO SET POLE

It frequently happens that such temporary track extends close to a corner at which there is special work, including an electrically operated switch, the temporary trolley not joining the main trolley until the overhead contactor has been passed. Under these conditions, it is now the practice in Cleveland to install on the temporary trolley a second contactor, which is connected up in parallel with the permanent one by simply running jumper wires over from the permanent contactor, thus keeping the electric switch operative and incurring no more delay than takes place under normal operation.

ELIMINATING HALF THE POLES

Two schemes of overhead construction which require but one-half the normal number of poles are being tried out by the Cleveland Railway, both of which seem to be proving successful. One of these, roughly illustrated in an accompanying drawing and marked A, employs diagonal span wires, zigzagging across the street from one pole to the next. The two poles on the same side of the street are spaced 180 ft. apart, with the intermediate pole on the opposite side of the street half way between. In other words, every other pole, as normally set, is omitted on either side of the street. This scheme is employed purely for the purpose of reducing the first cost.

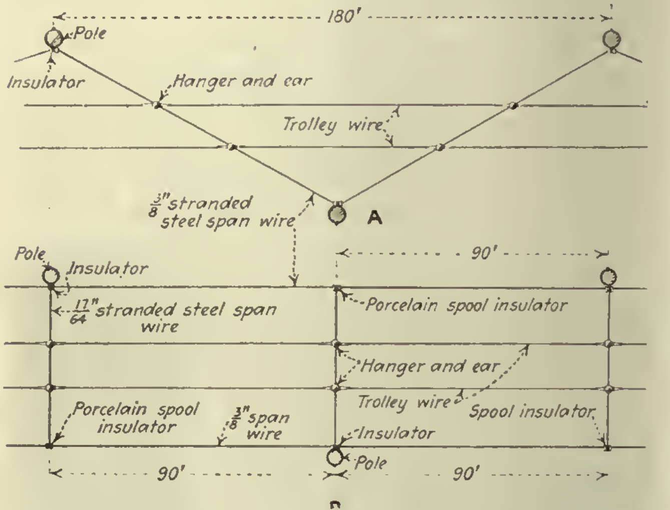
The other scheme of eliminating half the poles, roughly illustrated at B in the same drawing, is utilized to reduce construction costs and also for other reasons. It is employed at points where for some reason it is impossible to erect a pole at the proper location on one side of the street, such as is illustrated in an accompanying picture. It is also advantageously employed where a new car line is to be built and it is desired to put the overhead up in advance of the track construction and as quickly and economically as possible. The scheme consists of setting poles 180 ft. apart on each side of the street, the locations on opposite sides of the street being staggered. A $\frac{3}{8}$-in. stranded steel messenger cable is strung along each side of the street and fastened to the poles with porcelain insulators. A span wire is then erected at each pole, extending across the street and fastening to the opposite messenger by means of a porcelain spool insulator.

Where the overhead is constructed in advance of a new car line, the messengers along either side of the street are erected and one of them connected to the positive and one to the negative side of the power supply, and thus used to provide energy for operating electric shovels and other track equipment. The span wires and overhead trolley are then installed after the track has been completed. This is a particular advantage for this type of construction, for in addition to saving half the poles and lending itself to quick installation, it affords a power supply and at the same time keeps the space above the street clear of overhead obstructions.

If thought necessary, the other poles opposite the ones set can later be erected without any change in the existing overhead except to extend the span wires to connect to the newly set pole, the messenger cables being then taken down. However, from the experience thus far, it appears that this type of construction using only half the usual number of poles is suitable for permanent construction.

Either of these types of overhead construction makes a long span (180 ft.) for the feeder cable, if one parallels the line, but while this requires the use of a heavier insulator it has involved no trouble.

MOVABLE TRACK AND OVERHEAD AT DUMP



ROUGH SKETCH OF TWO TYPES OF OVERHEAD ELIMINATING HALF THE POLES

Material excavated from streets and other waste material of the Cleveland Railway is hauled in cars to a dump for filling in a great gully. The track is laid along the inside edge of the bank, and the material is dumped directly over the edge of the bank, rolling down to a position of rest. Formerly, the overhead for this track was supported by cables strung clear across the gully. It was necessary every few weeks to move the track over to the edge of the bank as the hole was filled in, which, of course, made it necessary to slide the trolley out to the new position by moving the hangers out farther on the long cross-spans.

The overhead department got tired of this frequent shifting of trolley and so devised a scheme whereby the track department would shift the overhead along with the track. A 4-in. x 12-in. plank about 14 ft. long was placed under the rails and spiked to them at each pole location. The poles were then sawed off and placed on top of these planks and braced with 2-in. x 8-in. pieces of plank. Heavy blocks were spiked to the pole and the bottom plank to keep the butt from shifting longitudinally on the plank. Vertical timbers spiked to the plank and the pole kept it from shifting laterally. Now, as the track department shifts the track to a new location, the trolley moves right along with it. The tension in the trolley is kept uniform and tight by dead ending the wire over a snatch block on the last pole at the end of the track and hanging a couple of car wheels on the end of it, the last pole being guyed. This overhead and movable track are ten spans long.

MISCELLANEOUS PRACTICES

On the high bridges over the Cuyahoga River, on which the Cleveland Railway has four tracks, there is often a very high wind, making overhead repair work exceedingly difficult. To minimize the trouble likely to accompany a broken trolley, each pair of trolley wires is cross-connected at every span. There is also a feed-in tap at every fifth span. With this interconnection of the copper, any break in the wire causing a short circuit will anneal the wire only a very short distance, thus reducing the replacement necessary.

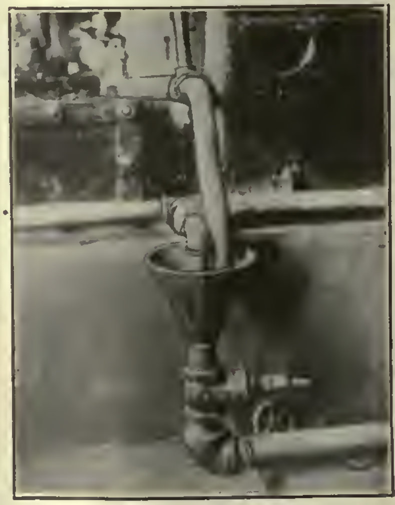
A special spring hanger for use in trolley troughs under viaducts and designed by Mr. Scott was fully described on page 110 of the July 21, 1917, issue. Some of these hangers installed under one of the viaducts have now been in service nearly five years without replacement or repair. The principal feature of this hanger is a long spring suspension, having a good deal of flexibility of movement and being quite effective in reducing flashing. Some of these ears were also used on the high bridge where the cars operate over a lower level with comparatively low overhead. Two other types of spring hangers were also tried out on this bridge.

It is planned to install 100 of these spring hangers on open overhead construction with No. 0000 wire, as an experiment. The wire always breaks at the ear because of the weight of the ear and hanger and the sharp bend that takes places at the ear as the trolley wheel approaches. The spring hanger is to be tried out to see if the flexibility thus afforded will not relieve this strain upon the trolley wire and lengthen the life by cushioning the blow of the wheel at the ear.

Concrete trolley poles are now in extensive use in Cleveland and are being used more and more all the time. According to Mr. Scott, they have proved very satisfactory and require no painting or other maintenance.

All together, fifty-two men are employed in the entire overhead department of the Cleveland Railway, which has about 410 miles of single track and operates 1,065 motor cars, 454 trailers, etc. In the work of this department, two tower trucks and four men do all of the emergency trouble work for the entire system. Five other tower trucks owned by the department are used for renewal and new construction work. Three trucks without towers are used, one exclusively for hauling the fire hose jumper, one for pole painting, and one for general hauling.

Preventing Washing in Waste Water



FUNNEL GUARD FOR PREVENTING USE OF WASTE WATER FOR WASHING

THE accompanying illustration shows a funnel type of construction arranged to carry off the circulating water from a shop compressor in the Thirty-sixth Street inspection and overhauling shop of the Brooklyn Rapid Transit Company. Previous to this installation shop men would congregate at this point a few minutes before quitting time in order to wash up in the warm water as it came from the compressor. As this shop is provided with wash rooms and other conveniences for the shop men, this type of construction was devised with the two pipes entering the funnel, so that it is impossible to get the hands underneath the water as it flows from the pipe.

Trolley Bus Operation Commences on Staten Island

Municipally Owned and Operated Trolley Buses of the City of New York Have a Successful Trial Trip—Appropriate Speeches Heard at Sea View Hospital, the Terminus of One of the Routes

THREE TROLLEY BUSES ON LOOP AT SEA VIEW HOSPITAL READY FOR TRIAL TRIP

ON SATURDAY afternoon, Oct. 8, amid a noisy demonstration, assisted by the Police Band, three municipal trolley buses left Sea View Hospital for Meier's Corner and Bull's Head. This was the culmination of exercises held in the auditorium of the city hospital at Sea View at which Mayor Hylan, Grover A. Whalen and Borough President Van Name felicitated each other, told of the development of the trolley bus and urged that it was for the people's interest that the 5-cent fare be maintained. It was truly a demonstration for Mayor Hylan and his cohorts.

In speaking of what led up to the operation of the Staten Island Midland Railway trolley lines by the Department of Plant and Structures, City of New York, Borough President Van Name told how Commissioner Whalen had opened up the trolley car level of the viaduct at St. George to public vehicles after the trolley cars had ceased to operate. This permitted the buses within forty-eight hours to carry their passengers direct to the ferries and allowed them the same privilege of solicitation as the trolleys. Cheap transportation is absolutely necessary for an outlying borough like Richmond, he said, for residents must necessarily pay a fare in Manhattan, another on the ferries and a third on Staten Island. It is therefore a most serious matter to increase local trolley fares.

President Kauf of the local Chamber of Commerce, who presided at the exercises, in introducing Commissioner Whalen stated it was right to celebrate epochs, and the opening of this trolley bus line is surely an epoch in the life of Staten Island and but a forerunner of a form of transportation that will open up all parts of the island. He told how he himself had been looked upon as almost crazy when twenty-five years ago he petitioned for the right to build a passenger trolley line from St. George to Richmond and to give for 5 cents what had formerly cost passengers $1. Many people insisted it would not pay. However, he believed in the law of transportation matters that each new form of service created its own traffic.

This new method of transportation, said Commissioner Whalen of the Department of Plant and Structures, City of New York, which will soon be put into service is a real municipal plant, conceived, designed, and constructed throughout by municipal employees. Much of the credit is due to C. T. Perry, electrical engineer of the department. Commissioner Whalen continued:

"The fundamental proposition in the installation of these trackless trolley systems on Staten Island is to provide transportation for the hitherto inaccessible village of Linoleumville and to provide means of access to a great city institution, Sea View Hospital.

"We feel, however, that we are doing more than merely meeting local necessities. We feel we are introducing and demonstrating a new system of transportation that will enable Mayor Hylan to make still more certain the maintenance of the 5-cent fare and that will be of the utmost practical value to the city administration in making financially feasible the establishment of transportation lines to serve sections of the city that are now without transportation. There are vast areas, not only in Richmond but in Queens and the Bronx, that can be made available for housing only by such lines.

"Our reason for believing that the trackless trolley system is an answer to urgent needs of this city is its comparatively small cost.

"The cost for single-track trolley construction per mile varies from $37,000 to $60,000, according to the nature of the roadway that has to be torn up and relaid. The cost for trackless construction is approximately $4,000 per mile. The trolley system destroys the roadway; the trackless system does not. Its wear and tear on the roadway is no more than that due to automobiles.

"We have studied out all the elements of cost, including initial investment, maintenance, depreciation and operation, and have found that the cost per car-mile of the trackless system figures less than the cost of one-man trolley operation and less than the cost of gasoline buses. The figures are as follows:

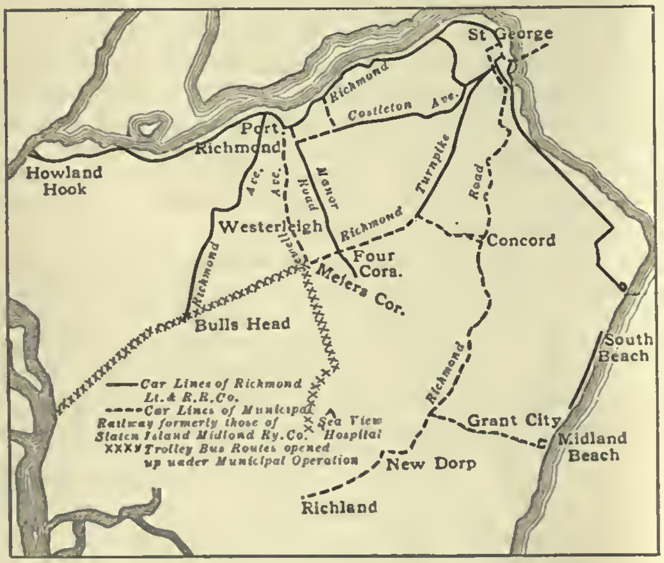
Standard safety car, per car-mile	24.3 cents
Gasoline bus	29.55 cents
Trackless trolley car	20.95 cents

"The department believes, therefore, that in installing these trackless trolley systems on Staten Island the city is inaugurating a method of transportation that will make possible the rapid and economical development of the outlying portions of the city and that will be found of immense practical value in enabling the city to clear its streets of the rails that now encumber them."

In his remarks Mayor Hylan reviewed largely what had taken place during his term of office. With regard to transportation matters, he contended that he had tried to render every possible transportation service to the people of New York, especially those that lived in the outlying boroughs. The closing down of the Midland line was the first attempt to force the city to grant an increased fare in New York. Motor bus operation was the result until the existing agreement covering municipal operation of the trolley cars had been made. In New York $1,000,000 was appropriated for motor buses and if it had not been for an injunction there would probably have been hundreds of them operating at a 5-cent fare. Now the traction agents want to grab the only valuable franchise left, the bus franchise. Even the Transit Commission advocates giving away this valuable bus franchise.

The system comprises two trolley bus routes, both terminating at Meier's Corner. They are really extensions to the municipally operated trolley lines and tap territory without any other form of transportation. While the population is not extremely large, nevertheless some systematic form of transportation was becoming a necessity for the further development of the territory. The accompanying map shows not only the trolley bus routes but the rail lines operated by the Richmond Light & Railroad Company and the city of New York.

One of the trolley bus routes extends from Meier's Corner to the Sea View Hospital via Bradley Avenue and Brielle Avenue, a distance of 2.6 miles. The second line operates over the Richmond Turnpike from Meier's Corner to a settlement called Linoleumville, via Bull's Head. The length of this line is 4.4 miles.



MAP SHOWING LOCATION OF ALL TROLLEY AND TROLLEY BUS LINES ON STATEN ISLAND

The unit rate of fare on each route is 5 cents. No transfers are given between the two trolley bus routes or the municipal trolley cars. Under the plan of accounting in effect between the Midland company and the city of New York for the operation of the trolley lines it is impossible to issue or accept transfers between the two transportation systems. Nevertheless, even with the single 5-cent fare on each system of transportation the car rider will reach his destination at a considerably lower cost than heretofore, for the taxi operators have charged almost any price up to $1.50 to carry a passenger 2 or 3 miles.

Both of these routes follow improved paved roads. Bradley Avenue, on the Sea View line, is paved with bituminous macadam, Brielle Avenue has a concrete subbase and asphalt top and the roads in the hospital grounds are of asphalt brick. Richmond Turnpike, which the Linoleumville route follows, has an 18-ft. concrete roadway as far as Bull's Head, a distance of 2 miles. The remainder is paved with bituminous macadam.

As for grades encountered, there are none whatever along the Richmond Turnpike, but the line to Sea View has some very steep hills. For instance, one hill alone on the outbound trip from Meier's Corner is about 1,200 ft. long and has a grade of between 10 and 11 per cent; in fact, it could be said that the line was almost a continuous climb, for the city hospital is located on one of the highest points on Staten Island. The trolley buses, however, have not so far failed to negotiate these grades, it being possible to climb them on "high."

THE OVERHEAD SYSTEM

Span construction is used throughout with 30-ft. chestnut poles, set directly in earth as was found. In some cases this was gravel or sand. Very little rock was encountered. The poles for the most part have had their butts treated by an application of creosote using the brush method. Spans using ⅞-in. galvanized iron wire were put up at a height of 20 ft. so as to support the two trolley wires 18 ft. above the street level. Where there are four wires over the street a special method of supporting them had to be used to keep the wires of each set in the same horizontal plane. The suspension consists of two span wires one above the other with a strut in the center joining them to take out the sag in the lower wire, the one supporting the trolley wires.

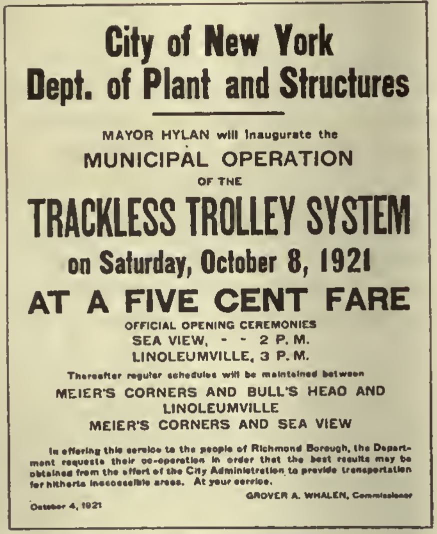
The feeder system consists of two 500,000 circ.mil rubber-covered aerial conductors supported on the pole pins of a 4-pin arm. These feeders extend from the power house at the city hospital along Brielle and Bradley Avenues to Richmond Turnpike, where they are tapped into the Linoleumville trolley wires.

The two trolley wires are hung on 14-in. centers. The route to Sea View has but a single pair of trolley wires strung over the center of the street, while on the Linoleumville route, due to the heavier amount of vehicular traffic to be encountered, two sets of wires, one for use in each direction of traffic, was necessary. Figure eight trolley wire of 00 size with screw clamp ears is used throughout. The trolley hanger hardware is of the type designed by the General Electric Company for double trolley work with double porcelain insulation between the trolley wires and the spans. At the ends of each of the lines loops are provided so as to eliminate the necessity of wyeing on a single set of wires. These loops all have different radii—that in the driveway of the Sea View Hospital administration building has a radius of 30 ft.; that at Meier's Corner 22 ft., while that at the terminus of the line at Linoleumville is 70 ft. in diameter. The type of construction at the hospital loop, which is typical, is shown in the accompanying illustration.

Power is furnished by a two-phase, 220-600-volt motor-generator set especially installed in the main power house of the Sea View Hospital. The installation was made by J. L. Hemphill & Company, Inc., Hoboken, N. J. The two-phase motor is of the G.E. type and has a capacity of 400 hp. at 220 volts and 900 r.p.m. It drives a Westinghouse direct-current generator capable of delivering 250 kw. at 600 volts.

THE ROLLING STOCK

The eight trolley buses which comprise the rolling stock were built by the Atlas Truck Company, York, Pa., and follow the specifications drawn by C. T. Perry, electrical engineer, Department of Plant and Structures, city of New York. An abstract of these specifications was printed in the ELECTRIC RAILWAY JOURNAL, May 28, 1921, page 1002. They have a seating capacity of thirty with a 24-in. center aisle, which affords ample standing room for fifteen more passengers. The electrical equipment, similar throughout to that used on the safety cars, was furnished by the General Electric Company. Two G. E. 258 ventilated railway motors furnish the propulsion force and are mounted in tandem amidships and arranged for series parallel control. Power is transmitted by a Sheldon worm drive to the driving wheels. The car can easily maintain a speed of from 20 to 25 m.p.h. on a level road. A hand-operated controller, type K-63 F, interlocked with a foot pedal safety device or dead man control, is located at the left of the driver, where it can be easily operated by his left hand. The first contact point for operation is obtained by a movement of the foot pedal and acceleration is had by a hand movement. The service foot brake as well as the hand emergency brake lever are located in front of and directly to the right of the driver's seat. At the immediate right is the lever for opening and closing the service door.



City of New York
Dept. of Plant and Structures

MAYOR HYLAN will inaugurate the
MUNICIPAL OPERATION
OF THE
TRACKLESS TROLLEY SYSTEM
on Saturday, October 8, 1921
AT A FIVE CENT FARE
OFFICIAL OPENING CEREMONIES
SEA VIEW, - - 2 P.M.
LINOLEUMVILLE, 3 P.M.

Thereafter regular schedules will be maintained between
MEIER'S CORNERS AND BULL'S HEAD AND
LINOLEUMVILLE
MEIER'S CORNERS AND SEA VIEW

In offering this service to the people of Richmond Borough, the Department requests their co-operation in order that the best results may be obtained from the effort of the City Administration to provide transportation for hitherto inaccessible areas. At your service.

GROVER A. WHALEN, Commissioner

October 4, 1921

WINDOW CARD USED ON MUNICIPAL TROLLEY CARS TO ANNOUNCE OPENING OF TROLLEY BUS LINES

The interior finish of the bus body is white enamel, with the exception of the Hale & Kilburn seat frames, which are battleship gray. The window sashes and sills are natural finish. Seat coverings are Spanish leather.

As will be noticed, the collector is of the type first used on the trolley bus designed for Richmond and described in the ELECTRIC RAILWAY JOURNAL, June 25, 1921, page 1160. The hickory pole is supported on a ball-bearing base which allows free play to the pole so that the car can swing 9 ft. 6 in. off the center line of the wires without dewiring. At the base of the trolley pole and inside the body is a hand maneuvering device by which the operator can raise or lower the pole or swing it from side to side to meet the varied operating requirements without leaving the car. Springs in the trolley base furnish sufficient tension to insure suitable contact pressure between the pole head and trolley wires. A different and lighter type of collector is to be tried out in the immediate future.

Illumination is furnished by two five-light circuits from the trolley circuit. In addition there are emergency lights, two at the rear, one each over the step and the driver's seat. These are operated from a six-cell Prestolite battery, which is charged from a generator mounted on the forward end of the armature shaft. A low potential relay cuts into the circuit the emergency lights in case the trolley pole leaves the wire. The battery also furnishes power for the type S-74 Golden Glow headlights, the tail-lights and steplights.

United States solid rubber tires on American Cushion wheels are used throughout. On the rear wheels are mounted 36 x 8 rib tread solid tires and on the front wheels 36 x 6 "Highsize" single solid tires are used.

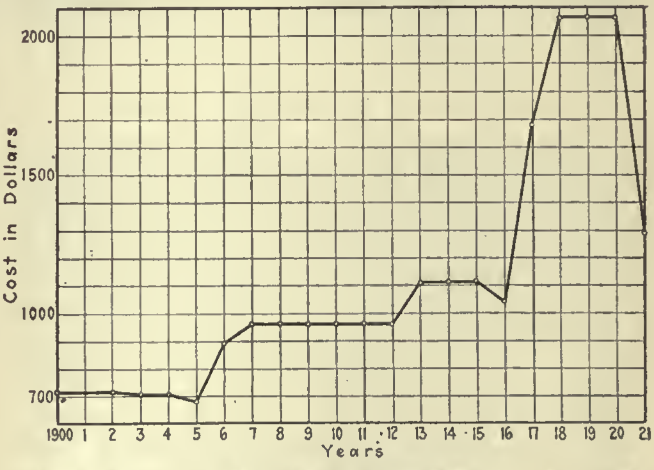
Consolidated Car Company Type A heaters are used. One is located under each of the six cross seats, two on each end of the seat across the rear end of the body and two mounted on the inside of the front dash.

Special Trackwork Prices

THE accompanying graph shows the cost of a double track 90 deg. crossing for any year from 1900 to 1921. Based on this chart, the tabulation for special trackwork costs shown in the accompanying table was worked out. This shows the present variation in price for each year, taking the price of 1900 as a base.

PER CENT VARIATION OF SPECIAL TRACKWORK COST FROM BASE PRICE AS OF YEAR 1900

Year	Increase, per Cent	Decrease, per Cent	Year	Increase, per Cent	Decrease per Cent
1900	...	..	1911	33⅓	..
1901	...	..	1912	33⅓	..
1902	...	..	1913	54	..
1903	...	2	1914	54	..
1904	...	2	1915	54	..
1905	...	5⅓	1916	44½	..
1906	23⅓	..	1917	132⅓	..
1907	33⅓	..	1918	186	..
1908	33⅓	..	1919	186	..
1909	33⅓	..	1920	186	..
1910	33⅓	..	1921	80	..



COST OF DOUBLE TRACK CROSSING—90-DEGREE STANDARD GIRDER HARD CENTER CONSTRUCTION

This chart and tabulation may form the basis for other calculations. Thus, if it is desired to construct a graph for a certain layout or piece of special trackwork, all that is necessary is to know the price paid in a certain year, and use the table. Thus, if a company paid $300 for a tongue switch in 1919, and it is desired to know the price paid in 1914, then by the use of the table the price would be $\frac{300}{286} \times 154 = \$161$.

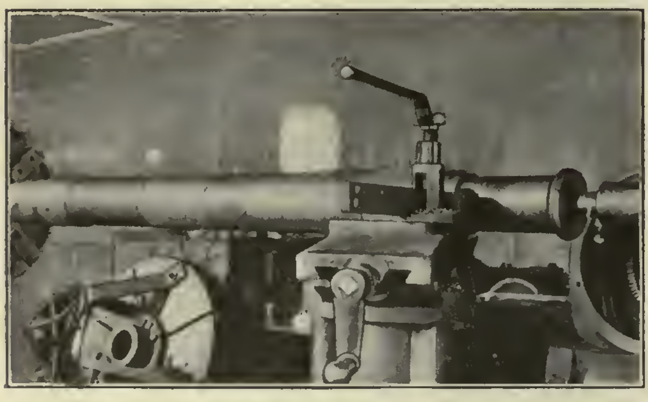
Equipment and Its Maintenance

Short Descriptions and Details of New Apparatus of Interest to the Industry. Mechanical and Electrical Practices of All Departments

Shop Notes from Michigan City

Hot Boxes Are Eliminated by Rolling New Journals—This Had Formerly Been a Common Cause of Trouble—Simple Tension Machine Facilitates Armature Banding

THE DIFFICULTY with hot bearings, which has been common with the very heavy single-phase cars on the Chicago, Lake Shore and South Bend Railway whenever a new axle was installed, has apparently been completely eliminated by a simple process of rolling the journals. Formerly, the bearing surfaces of the axle were smoothed up to an apparently even surface by filing and the use of oil and emery paper. It was a common experience, however, to have to change the babbitted shell-type bearings two or three times before the surfaces became worn so that the bearings would not run hot.

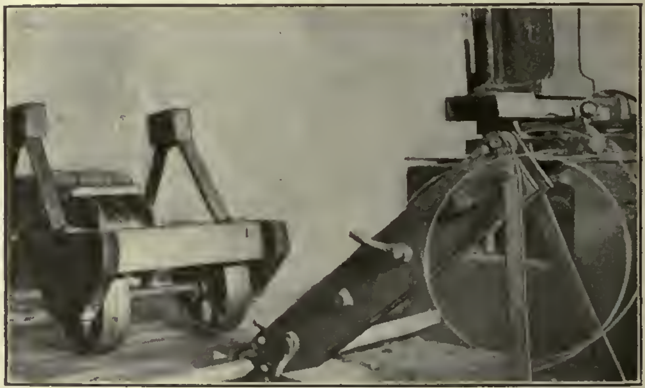


The Rolled and Unrolled Portions of the Axle Surface Can Be Seen at the Left of the Tool

The scheme now followed is to run a case-hardened steel roller over the bearing surfaces. After the last finishing cut on the axles is taken, the roller is substituted in the lathe tool post for the cutting tool and forced up against the bearing surface of the axle by means of the cross-feed screw, as much as can be done by hand. The lathe is then started and the roller run back and forth once over the surface, using the regular lathe feed. The roller is about 2¼ in. in diameter with a flat face ¾ in. wide and having the edges rounded off. In passing over the surface of the axle, this roller seems to compress the metal ridges left by the cutting tool, leaving a smooth and polished surface. No further smoothing of any kind is done. Of forty-six new axles started off after finishing in this way, no hot boxes have occurred.

M. M. Lloyd, master mechanic, who originated this practice at the Michigan City shop of this high-speed single-phase line, states that the idea is not original with him but is one followed by many steam road shops. The motor axle bearings are rolled in the same manner and also the armature bearings.

Having had unsatisfactory results from various tension machines for use in banding armatures, Mr. Lloyd had the machine built which is pictured herewith. It has worked out very satisfactorily in providing uniform tension of whatever amount desired. This machine consists of four grooved-steel pulleys, 3 in. in diameter, supported on ¾-in. posts between two pieces of ½-in. x 4-in. x 30-in. steel bars. The pulleys are turned with a shoulder on each side and leather washers are inserted between the pulley and side frame. On one end of each bolt is a lever type nut, with which the tension on the banding wire may be adjusted by loosening or tightening the nut. Two of these levers are on one side of the frame and the other two on the opposite side, and approximately equal tension is set up on each.



Home-Made Tension Machine Which Has Improved the Armature Banding Work

At each end of the supporting frame a small steel block is provided with a hole through which the wire is fed. The back end of the frame is hooked over a pipe which is strapped to the floor, while the end of the frame nearest the lathe on which the armature is mounted is supported on a triangular shaped leg. The rear connection holds the machine at a fixed distance from the lathe but makes it possible to shift the machine laterally so that it will line up with the proper position of the banding on the armature. The triangle support at the rear end makes it possible to adjust the height of the tension block so that the wire pulls approximately straight out of the block to the armature. This triangle is 14 in. high when standing vertically. The whole machine is mounted on the floor behind the lathe.

Taking Up End Play in Armature Bearings

End play in armature bearings on the South Shore Line is kept to a minimum by the use of galvanized iron or heavy tin stampings which are slipped over the brass up against the collar to take up the wear on the inside end of the bearing shoulder. These stampings are very cheap and come in various thicknesses, and sometimes two or three of them are inserted. This scheme is used only with bearings having a keyway.

More than a year ago one of the Davis steel wheels used to a certain extent by this company chipped out on the tread, leaving a hole which acted much like a slid flat. As an experiment, the hole was filled up with an acetylene welder, and while the metal was still hot it was hammered out as near to the proper contour of the tread as possible. A wheel-truing brakeshoe was then used on this wheel for one trip, and thereafter the car continued in normal service. Fourteen months later this wheel came in with another spot chipped out and inspection at that time showed that the former weld could be scarcely found. As nearly as could be ascertained, the welding had not injured the metal at all, so the new spot was filled in in the same manner and the wheel put back in service.

TELEPHONE SIGNAL SYSTEM

An effective signal system for calling the master mechanic or shop foreman to the telephone from any part of the shop is in use in the Michigan City shop. A whistle connected with the shop air supply is fitted with a magnet for opening the valve and electrically connected to the dispatcher's office. The dispatcher presses a button once or twice, giving one or two short blasts of the whistle to signal whoever is wanted to the telephone.

Safety Cars Built by Texas Railway

THE Texas Electric Railway has just completed and placed in service eight single-truck safety cars of a type illustrated herewith. These cars were built in the company's shop and cost complete $3,600 each.

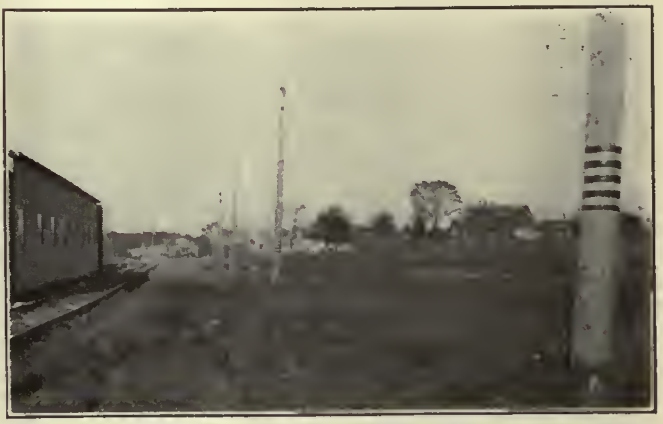
NEW SAFETY CARS OF THE TEXAS ELECTRIC RAILWAY

They are operated on the same schedule and same lines as the "Birney" safety cars owned by the company. Second-hand trucks were purchased and remodeled for use with air brakes.

These cars have wooden underframes and posts with steel dashers and sides. The bumpers are of angle iron and angle reinforcements are used for platform knees. The underframe, posts, plates, belt rail and interior finish are long-leaf yellow pine. The roof carlins, sash and doors are straight-grained white oak. Native woods were used in the construction of these cars as previous experience had shown that they are less subject to decay than imported material. The cars are 27 ft. 10½ in. over bumpers, 17 ft. 8 in. over body, 8 ft. 1½ in. wide over belt rail and weigh 16,800 lb. equipped. Some of the equipment used consists of Brill 21-E trucks, CP-25-C air compressors, International R-5 registers, Johnson fare boxes, "Golden Glow" SM-95 headlights, Consolidated 92-T heaters, "Keystone" destination signs, Heywood Brothers & Wakefield seats, Crewsome pneumatic gongs, US-15-B trolley bases, K-63-B controllers, GE-81-A and 201-G motors, curtains, "Fabrokoid," and air brake and safety control, Safety Car Devices Co.

Poles Painted to Indicate Positive Stops

POSITIVE stops for the cars of the Detroit municipal system are to be indicated and the motormen forewarned by a system of painting the poles adjacent to the stop. On the fourth pole from the stop appear four white stripes painted with aluminum paint on a black background. The next pole has three such stripes, the next two and the last pole before the stop one. Because of the nature of the paint these markings show up from the headlight and street lights very well at night.

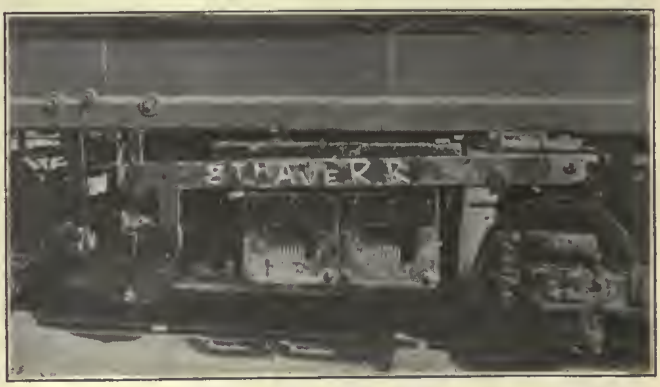


SCHEME OF PAINTING POLES TO FOREWARN MOTORMEN OF POSITIVE STOPS

Having these warning signs, there is no excuse for a motorman not having ample time to make the stop or knowing when he is approaching a stop and how far from it he is. The idea originated with the Connecticut Company, where it is extensively used on the interurban lines. It is to be adopted for the Detroit city system.

Marking Drawbars to Prevent Theft

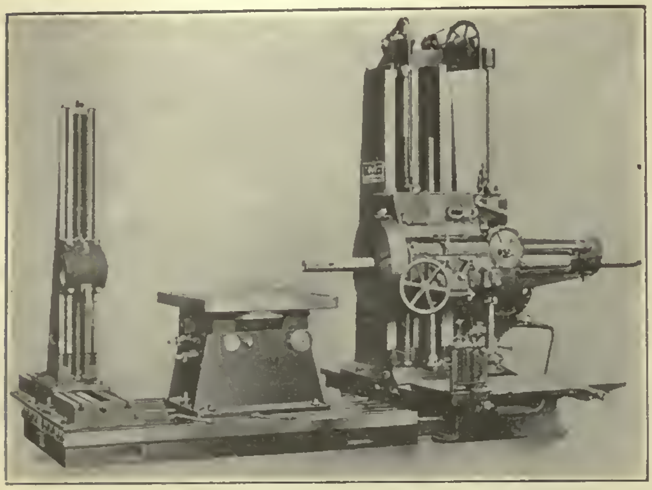
THE Eighth Avenue Railroad, New York City, experienced considerable difficulty from the theft of drawbars from its cars. C. P. Westlake, supervisor of equipment, evolved the scheme of lettering these by the addition of metal through electric welding. This method has proved very satisfactory and has effectively remedied the trouble. The lettering can be added in a very short time, and as the metal burns into the surface of the drawbar there is no effective means of removing it from the car. The halftone view shown above illustrates one of these drawbars as lettered installed on the side of a car.



DRAWBAR LETTERED WITH ELECTRIC WELDING

Boring, Drilling and Milling Machine

A NEW line of horizontal boring, drilling and milling machines has been developed by the Pawling & Harnischfeger Company, Milwaukee, Wis., of which the 4-F machine shown in the accompanying illustration is the smallest size. This machine is especially designed for very heavy milling and large boring operations. Some of the special features are: All feed screws in tension; all sliding parts with take-up for wear; saddle fully counterbalanced with counter-weight located inside of the column; centralized control; all milling feeds actuated through quick pitch worm and bronze worm wheels, revolving on quick pitch screws in tension; interchangeable; externally and internally driven face plates; back gears close to spindle, making all drive shafts high speed; automatic stops for saddle and column for machines electrically driven.



HORIZONTAL BORING, DRILLING AND MILLING MACHINE

New Metropolitan Electric Locomotive

THE Metropolitan Railway of London has under course of reconstruction twenty of its existing electric locomotives. High-capacity electrical apparatus is being installed and arranged on supports in a central position down the cab of the locomotive, ending in a main switchboard at each end and surrounded by a hand rail which leaves ample space on either side for cleaning and inspection of the equipment.

The control is the automatic multiple-unit electric type, with sufficient steps on the master controller to allow of easy switching. Below the electric equipment in the cab are situated two motor-driven vacuum pumps and one air compressor, together with their respective reservoirs.

The company's standard arrangement of brake-tripping device is being considered with an improved electrical interlocking arrangement as a safeguard by means of which it is impossible for a driver to set his locomotive in motion without first having the brake apparatus ready for immediate application.

To enable the driver always to have a clear view in wet weather an automatic window wiper is being installed, operated from inside the cab. Either the vacuum or the air brake apparatus is available for use according to the class of work.

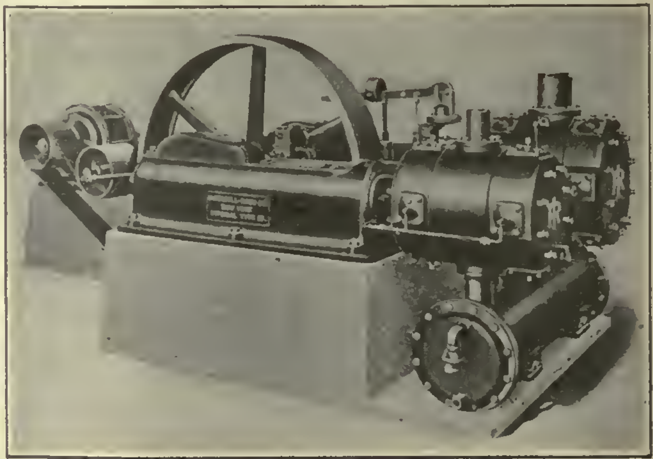
In order to give more even haulage and acceleration the locomotive takes current from the main power positive and negative bus lines coupled up electrically with the passenger rolling stock. These through-train lines connect with collector shoes on the first and last coaches. This provision enables the locomotive to collect the current when the collector shoes on the locomotive itself are bridging gaps in the conductor rail.

There are four motors mounted on the two trucks, each of 300 hp. capacity. The motor is carried on the axle by means of suspension bearings and a portion of the weight is transmitted by means of a nose on the motor castings which rests in a yoke sliding vertically up and down in guides fixed to the truck transom. A slight elastic support is obtained by means of rubber cushions. The running wheels are of the disk center type, having the brake shoes acting on both sides of the wheels. All pin joints in the brake gear are bushed with renewable bushings and case-hardened pins. The truck frames are of solid construction and consist of plate frames well stiffened with cast steel corner castings. Advantage has been taken of the latter for supporting the brake beams and levers. Side louvres are provided in addition to roof ventilators.

New Belt-Driven Air Compressors

THE Ingersoll-Rand Company, New York, has announced a new line of belt-driven air compressors, known as the "Imperial" Type "XCB." Features of construction include plate valves, for both the air intake and discharge, and five-step clearance control for regulating the compressor's output.

The plate valves used in this type of compressor are the result of a complete analysis of the light-weight plate type of valve. They include features which have been found necessary to the functioning of this type of valve, the most important of these being that the valve is supported throughout its entire operation in perfect alignment without any form of wearing guide.



BELT-DRIVEN AIR COMPRESSOR

With the clearance control the compressor is automatically loaded or unloaded in five successive steps, these steps being obtained by the reduction or addition of clearance space to the air cylinders. The compressor will operate at full, three-quarter, one-half, one-fourth and no loads.

In the four cities clustered together on the east side of San Francisco Bay 3,353 residential building permits were issued during the eighteen months ended June 30, 1921, notes the *Engineering News-Record*, and of these 85 per cent were within three blocks of street car lines. The estimated cost of this 85 per cent was $15,030,412, as against $1,433,355 for the remainder.

Accountants' Association Proceedings

Three-Day Session Covers Wide Range—Discussion Centered Around Electric Railway Cost Accounting for Both Operating and Capital Accounting—The Question of a Standard Material Classification for Storeroom Records Also Brought Up

F. E. WEBSTER

Vice-president and treasurer Massachusetts Northeastern Street Railway, vice-president Accountants' Association 1920-21, presiding officer Accountants' Convention 1921, president Accountants' Association 1921-22.

THE opening session of the twenty-fifth annual convention of the American Electric Railway Accountants' Association convened at the Chalfonte Hotel, on Monday, October 3, and at 2:50 p.m. F. E. Webster, first vice-president and acting president of the association, called the meeting to order.

The rather novel idea of each delegate introducing himself and his company affiliation gave the meeting a touch of friendliness not often found at convention meetings. Following this, Vice-President Webster addressed the convention. An abstract of his remarks follows:

Address of Mr. Webster

"It was with a feeling of deep regret that we learned of the passing of our president, John J. Landers, on Friday, Sept. 9, 1921. Mr. Landers was elected an officer at the 1916 convention, and has always manifested a keen interest in making a success of our meetings. Aside from the loss of a friend and associate the association will miss his wise counsel and his unselfish interest in matters affecting the welfare of our organization. A special committee on resolutions will be appointed, which will report at this meeting.

"The street railway industry has not, as yet, emerged from the severe shaking which it received during the period of depression and the intrusion of many factors which operated to unsettle the foundations upon which a railway is built—the rendering of service to the public. Business depression has caused a curtailment in many lines of industry, producing an immediate cessation in travel, which is quickly reflected in gross revenues. Jitney service and bus transportation have also appeared as disturbing factors. The accountants have aided materially in the solution of their company's troubles by having available, or have taken prompt steps to establish them, such facts and data as were needed as a guide in the adoption of such ways and means as were necessary to formulate plans whereby corrective measures could be established.

"The burdens experienced in the process of readjustment have not been of our own choice, but I believe such a crisis is not without its compensations in that we now realize the inestimable value of the data furnished by the accountants and their departments. The advantage of following a standard classification of accounts has proved its value, and our records of operations have mapped the courses that our systems should follow.

"In this connection there is presented a situation to which our organization should give serious thought. Committee assignments are made and to these committees important matters are referred for consideration and report. To those appointed on committees a duty is attached, and such duty is quite often rendered at a real sacrifice, but the importance of it is found in their results which become accepted as standards as they reflect the judgment of experts and authorities. I believe, also, that the members in attendance at the annual conventions should freely enter into a discussion of the papers that are presented in order that there may be such an expression of ideas that the maximum benefit will be received.

"Regulation by public authorities has been prescribed by practically every state in the Union, and uniformity in practices will go far toward co-operation which is so essential. The annual convention of the National Association of Railway Utilities Commissioners will be held at Atlanta, Ga., Oct. 11 to 14, and the president of that association has been generous in his invitation to utility organizations to be represented. In such collective action a common benefit is a certainty.

"Following the 1920 Convention the Transportation & Traffic Association did not reappoint the joint committee on Collection and Registration of Fares which has been functioning for the past two years. In due course the accounting members of this committee resigned and it is now suggested that your Executive Committee discontinue that committee.

"The general plan of co-operation between affiliated associations of the American Electric Railway Association is a highly desirable feature, and there is one of our committees to which I direct your attention. For several years the joint committee on engineering accounting was active but with the advent of the war this committee was apparently abolished. I suggest that consideration be given during the present convention to a revival of the activities of this committee.

"It is interesting to review the various subjects of papers presented at former conventions, which are printed in the proceedings. This year's subjects are timely as well and carry out the high plane of previous years.

"An extract from an editorial in a recent issue of the ELECTRIC RAILWAY JOURNAL emphasizes a certain obligation:

> If there was ever a time in the history of the American Electric Railway Association when intimate counsel and discussion . . . was necessary and valuable it is at present. . . . The industry today is on the mend. But this fact does not remove the other fact that it is still in a critical condition and needs and deserves the leadership which can develop and grow as a result of constructive discussion of its problems.

"The selection of the subjects for this year's meetings, and the presentation of them by their authors is the result of a great deal of work on the part of the program committee, and I trust that due appreciation will be shown by real discussion following each paper.

"In taking up the work of the convention, which I trust will be of interest to us all, we should not lose sight of the fact that we owe a duty to the companies which we represent. This can be fulfilled only by a faithful attendance at all of the meetings. My wish, is that you all enter into the spirit of making this a real meeting and take an active and enthusiastic part in the discussions."

Reports of Executive Committee and Secretary-Treasurer

The report of the executive committee, covering its activities in detail for the year, was read by Secretary F. J. Davis. He also presented his own report as Secretary-Treasurer, which showed there were fifty-two individual members and 105 company section members allied with the association. Expenses incurred for the eleven months ending Sept. 30, 1921, totaled \$873.54, divided as between the cost of printing the papers and proceedings \$750.34 and mid-year meeting expenses of \$123.24.

Following the reading of these reports acting President Webster appointed, in accordance with executive committee action, a special committee to draft resolutions on the death of President John J. Landers, consisting of I. A. May, chairman; F. J. Davis and C. W. Stocks. The personnel of the regular convention committee in resolution was also announced as M. R. Boylan, chairman; J. S. Pardoe, and E. M. White. The chair also announced the personnel of the committee on nominations as follows: M. W. Glover, chairman; A. M. Curtis, W. E. Jones, H. L. Sanders, and W. K. Zinsmeister.

The report of the committee on standard classification of accounts was presented by Secretary Davis. An abstract of this report follows:

STANDARD CLASSIFICATION OF ACCOUNTS

During the year the committee has been called upon to give more than the average number of decisions to questions submitted to them, most of which have come through Director Wylie of the Bureau of Accounts of the Interstate Commerce Commission.

On May 20, 1921, Mr. Wylie released for publication in *Aera* and the ELECTRIC RAILWAY JOURNAL answers to seventy-eight questions that had been submitted and passed upon by his department and your committee. They were released with the understanding that these answers had not had the formal approval of the Commission and were therefore subject to such revision as might be thought proper before final publication in an accounting bulletin.

Under date of Nov. 17, 1920, the notice was received advising of the amendment to Section 20 of the interstate commerce act under date of Feb. 28, 1920. The section as amended provides that,

> The commission shall, as soon as practicable, prescribe, for carrier subject to this Act, the classes of property for which depreciation charges may properly be included under operating expenses, and the percentages of depreciation which shall be charged with respect to each of such classes of property, classifying the carriers as it may deem proper for this purpose. The Commission may, when it deems necessary, modify the classes and percentages so prescribed. The carrier subject to this Act shall not charge to operating expenses any depreciation charges on classes of property other than those prescribed by the commission, or charge with respect to any class of property a percentage of depreciation other than that prescribed therefore by the commission. No such carrier shall in any case include in any form under its operating or other expenses any depreciation or other charge or expenditure included elsewhere as a depreciation charge or otherwise under its operating or other expenses.

The notice also stated that for the purpose of carrying out these requirements the commission has created a depreciation section of the Bureau of Accounts in charge of Frank S. Fowler. The duties of this section will be devoted exclusively to the consideration of matters pertaining to depreciation covered by the amendment and it will, as quickly as possible, proceed to call upon the carriers for such information as it may require to aid the Commission in determining the classes of property subject to depreciation and in fixing just and reasonable percentages of depreciation to be applied thereto.

This notice was promptly acknowledged and your committee stated that it stood ready to confer or assist Mr. Fowler in any way.

Realizing the importance of this subject the committee called it to the attention of President Gadsden and after consideration by the Executive Committee of the American Electric Railway Association the committee was made a special committee of that association to handle matters in connection with the Depreciation Section of the Interstate Commerce Commission.

The committee immediately took up the subject and held a meeting in New York on Feb. 25, 1921. This meeting was attended by Lewis Lillie, vice-president of the United Gas Improvement Company, representing a joint committee which was considering the same subject in the interest of several industries that also come under the control of the Interstate Commerce Commission.

It was the opinion of the committee that the question so far as it related to electric railways, could not with advantage be linked up with its application to other public service companies.

On March 8 the committee met in New York with Mr. Fowler to determine the procedure to be followed in submitting the views of the electric railways. It was decided to submit, as soon as practicable, a brief embodying its views.

Accordingly the committee under date of March 18, 1921, submitted to Mr. Fowler a brief covering each of the following subjects: Original construction good or poor, physical decay, use, wear and tear, climatic and soil conditions, maintenance and deferred maintenance, age, inadequacy, obsolescence, franchise regulations, the human element, public demand, financial condition, and size of property. The brief concluded with the statement: "We are strongly of the opinion that . . . each electric railway company should be permitted to work out from its own experience such charges for depreciation as its own experience determines to be reasonable and proper, such rates to be subject to review and any manifest errors or irregularities to be corrected."

It is the understanding of the committee that before any rules are finally promulgated by the Interstate Commerce Commission, that those interested will have an opportunity to be heard if they so desire.

The report was signed by H. L. Wilson, chairman; William F. Ham, William H. Forse, Jr., R. N. Wallis, and P. S. Young, as members.

REPRESENTATIVES AT COMMISSIONERS' CONVENTION

The report of the delegates representing the association at the 1920 meeting of the National Association of Railway & Utilities Commissioners was likewise read by Secretary Davis. The committee stated that the reports presented at that meeting covered a number of subjects vital to all public utilities and that the report of the committee on statistics and accounts at that meeting dealt entirely with gas and electric accounting systems. The committee, however, has during the past year taken up the matter of a standard form of annual report required of electric railway companies, by public authorities. Of the forty-seven State commissions addressed, New Mexico failed to report; two (Iowa and Mississippi) reported no jurisdiction; twenty-nine reported the adoption of the Interstate Commerce Commission form of report; three (Montana, Nebraska and North Carolina) reported a more simplified form of report; five (Illinois, Wisconsin, New Jersey, New York First and Second Districts) have adopted forms requiring utilities to report more data than is demanded by the Interstate Commerce Commission form, while eight do not require the filing of a financial report. Of the latter, the Commissions of Louisiana, Minnesota and Tennessee expect to prescribe a form of report in the near future, and this committee is endeavoring to have them adopt the Interstate Commerce Commission standard. The State of Delaware does not have a public utility commission. The Railroad Commission of the State of Arkansas has no jurisdiction over street railway companies operating within incorporated limits and therefore requires no annual reports filed.

The report was signed by C. S. Mitchell, chairman; B. W. Fernald, and John M. C. Horn.

In view of the fact that none of the members of the committee could attend this year's forthcoming convention in Atlanta, acting President Webster was empowered to appoint a special representative.

A letter was also read from B. W. Fernald, Oakland, Cal., urging the committee to take such steps as possible toward having the annual reports made up from loose-leaf forms and afterward bound. Such a procedure he claimed would materially cut down labor costs in their preparation, for now it is necessary to fill in these seventy-two page reports entirely by hand. With the loose-leaf system the work could be typewritten and copies run off on a duplicating machine.

ELECTRIC RAILWAY COST ACCOUNTING

In introducing J. H. Bowman, Acting President Webster stated that he believed the time had come when cost accounting should be considered an important matter and perhaps within a short time the accountants would be called upon to furnish such information from their files. It was a question of how far to go into details and he hoped that Mr. Bowman's address would prove of much interest. An abstract of Mr. Bowman's paper on "Electric Railway Cost Accounting" is given elsewhere in this issue.

Following the presentation of the foregoing paper, George F. Dinneen, Holyoke (Mass.) Street Railway; M.

W. Glover, West Penn Railways, Pittsburgh, Pa., and Elmer M. White, Binghamton (N. Y.) Railway, discussed it.

Mr. Dinneen stated that he was of the opinion that the synthetic system as outlined by Mr. Bowman goes a little farther than the expense of maintaining such a system would warrant. It is questionable if the majority of electric railway companies would desire, at the beginning, to carry the cost system along to the point of allocating the cost of service per car seat unit. The benefits accruing from the synthetic system, he believed, would be more quickly attained by first ascertaining the cost in detail of maintaining the property and its relation to the investment.

It was his opinion that a cost system based on the second classification formulated by Mr. Bowman would furnish accurate cost data making possible the efficient management of the property. Information relative to the other classes could be derived from this information.

Many electric railways have already installed cost systems covering the maintenance using the Specific Job plan of cost-keeping. In the division of Maintenance of Way and Structures, the track, and roadway, and power distribution system could be divided into geographical sections, each section to be covered by a specific job. Bridges, structures and buildings could be treated in like manner. Superintendence and miscellaneous expenses could be allocated to the specific jobs on the basis of percentage of total expenditures on each job, with the exception of salaries and expenses, which should be charged directly to the job. Each job could be subdivided to show the cost of ballast, ties, rails, rail fastenings and joints, special work, paving, etc., and labor. By using a decimal system of numbering, track and roadway labor could be further subdivided into cost of excavating to bottom of ties, excavating below ties, handling ballast, ties, rails, rail fastenings and joints, alignment of track, paving, etc. Labor cost of cleaning and sanding track could be divided between the geographical sections applicable and material and miscellaneous expenses apportioned on their percentage to labor costs. Cost of removal of snow and ice could be treated in like manner.

In the division of maintenance of equipment, general practice calls for cost records of the different types of equipment used, the purpose in mind being to determine the type of equipment best suited for any specific use. While it is essential to know the comparative cost of maintaining different types of motors, controllers, air equipment, trucks, etc., the knowledge of maintenance costs of each individual car is most important, and may be obtained without interfering with the record of costs of parts or types of equipment.

To obtain such costs and still have a knowledge of maintenance costs of different types of equipment, a specific job number could be placed upon each car body and electric equipment therefor, exclusive of motors, and also a job number for each set of trucks, including motors. By dividing the car into two jobs, confusion will be eliminated upon transfer of trucks and motors from one car body to another. Jobs covering car bodies and electric equipment, exclusive of motors, could be further subdivided if desirable into cost of painting, repairs to car bodies, floors, controllers, trolley parts, trolley wheels, air equipment, etc., and jobs covering trucks and motors could be subdivided into repairs to trucks, wheels, axles, journal boxes, armatures, fields, etc. These subdivisions would permit the ascertainment of the cost of any type or parts of equipment by summarizing such types or parts of each job.

Allocation of the cost of shop equipment, shop and miscellaneous expense could be made to each specific car job by still a further subdivision by basing the use of machinery on the machine-hour plan.

The item of depreciation, Mr. Dinneen said, has been given very little attention by the electric railways in general, for but a few companies have made adequate charges to cover this item, due partly to the fact that, through lack of cost data, they assumed that depreciation was being fully cared for by renewals and replacements. With a cost system, similar to the one as outlined, no difficulty would be encountered in arriving at the item of accrued depreciation applicable to each unit. Such a segregation of expenditures would give a flexible and sound system of cost finding for these two maintenance divisions and would permit of unlimited detail for the larger electric railways, and of more concise information for the smaller companies.

M. W. Glover said it was difficult to add anything to the excellent paper presented by Mr. Bowman. It clearly shows the desirability of a system of cost accounting for electric railways, yet points out the danger of going to too great an expense in securing the information. It also shows that while the present classification of accounts is not primarily a cost accounting system, it can be adapted to that purpose, and it is the duty of accounting officers to find the means of determining costs of operations accurately as this information is needed by operating officials and they are entitled to it. He thought the plan should have a fair trial.

Mr. Glover then pointed out that when a statement of the cost of power is made, and it includes only the costs as shown in the classification under the general account "Power" and does not take into consideration taxes, depreciation, interest, damage costs, general overhead, and similar items, the statement is misleading. It may result in a small power house being continued in operation under the mistaken idea that power can be generated at less cost than if purchased from a large power company. In any cost studies, however, the engineering department must co-operate with the accounting department in order to obtain satisfactory results.

Elmer M. White told of the shop accounting system recently installed in Binghamton. The shop time cards are filled out usually by the workman to show the cars worked on. In some cases when the workman cannot write the foreman does it. The card also indicates whether the work was done on the car body, trucks, motors, etc. The time cards are later posted by a cost clerk on a distribution sheet. Individual car card records show the time worked as well as the material used. On the reverse side of this card is the daily car mileage record so that at the end of the year the maintenance costs of any individual or type of cars can be determined. A similar system is kept for special trackwork layouts. Depreciation can be figured either monthly or yearly and for each car or group of cars as may be desired.

The meeting ended in an informal round table discussion on the methods involved in charging off depreciation and the practices of allowing for depreciation in income tax reports.

Tuesday Afternoon's Session

At the opening of the meeting on Tuesday afternoon, I. A. May, Comptroller the Connecticut Company, read a resolution to the memory of former President John J. Landers, of the Accountants' Association, which was passed by a rising vote of the delegates.

Arthur Robert Weston then presented the joint report of the stores accounting committee of the Accountants' Association and the committee on purchases and stores of the engineering association. This report was printed as a part of the proceedings of the Engineering Association last week.

W. L. Davis, auditor Lehigh Valley Transit Company, in discussing the report said in part:

"Although the work of the Committee is described very fully in the Joint Report as submitted, it may be well to supplement the report in a few particulars.

It should be remembered that the report has been prepared with a view toward establishing certain recommendations as to fundamentals, and does not attempt to set forth any suggestions as to accounting methods to be used in arriving at final results as reflected in the general ledger; neither has it been drawn up for the purpose of establishing any particular accounting system. I understand that these features were purposely omitted, as the opinion among the individual members favored the consideration of the principles involved in the Material Classification and the standard methods to be used in maintaining records of physical stock before the subject of the relation between the storeroom material records and the general books, as we feel confident that a general discussion of the former matter would tend to bring out facts which would be of material assistance in the preparation of accounting systems and basic data for financial reports.

The standard Material Classification is, we believe, almost a necessity, but it may lose much of its value unless, upon installation, it is thoroughly explained to and understood by the various individuals responsible for distribution of accounts. If the stores account is subdivided in accordance with the classification as recommended, it will be necessary to classify not only the debits from vouchers, payrolls, etc., but also the stores credits from material issued. A misunderstanding of the classification on the part of one or more clerks or foremen might easily destroy its efficiency and make the final figures not only valueless, but positively misleading. This situation will require considerable "missionary work" on the part of the chief accounting officer, and his immediate subordinates, as erroneous application of sub-account numbers could soon transform a very useful and valuable classification into a veritable nuisance. This factor should also be considered in connection with the recommendations as to standard material reports, for obvious reasons.

While the standard Material Classification will be very desirable for the larger roads, it might be well for the members of the Association to make suggestions as to an abridged classification to be used by companies whose requirements might not be quite so extensive. Such a classification might be prepared in the same manner as the interstate commerce classification has provided for Class B and Class C roads, and could be considered by the committees.

I believe I am expressing the opinion of the committees in connection with the recommendations as to stock books in saying that these stock books are suggested with a view toward supplementing the "amount" or "value" ledgers with a record that will enable the storekeeper to establish a method of maintaining a permanent check between the ledgers and the physical stock, and are not intended to be considered as a substitute for the ledgers.

Personally, I feel that the work of the Stores Accounting Committee has just begun and that it will be able to render valuable service to the Association in the future if its work is continued.

FURTHER DISCUSSION ON STORES ACCOUNTING

Mr. Boylan suggested that it would be well for an additional column to be added to exhibit C to make space to carry an inventory. Mr. Cass of Philadelphia commented that the stock book had been adopted by the Philadelphia Rapid Transit Company, and had been found to be very helpful and of greatest service to the storekeeper. For this reason the order of items in the record is so arranged to give a sequence which will aid him in visualizing the stock on hand. The question was raised as to difficulties in securing the use of a uniform name for any material or equipment. Several expressed difficulties along this line, and one delegate said that his company is trying a cross index system, giving the nickname and after it the correct name. It would then be a duty of the stores clerks to supply the correct name.

The convention then took up the question of a Past President's badge and decided to authorize the executive committee to adopt a design of Past President's badge to be presented to all present and future Past Presidents.

ROUTINE ACCOUNTING

A paper was then presented by H. C. Hopson of New York on the "Adaptation of Routine Accounting Results to Particular Uses." This paper is presented elsewhere in ELECTRIC RAILWAY JOURNAL. Mr. Hopson took occasion to amplify by example some of the statements in this paper.

In discussion of this paper I. A. May said he was glad to hear Mr. Hopson urge that all accounting be done in the office which makes a business of accounting. Mr. May said he felt very strongly on this point. He said he had recently read several articles by engineers advocating perpetual inventories of physical property and some advocating a special department for such work. He said he had tried to answer this type of argument in a recent article in the ELECTRIC RAILWAY JOURNAL (see issue of Sept. 10, page 398) in which he pointed out that all records should be kept in the accounting office. M. R. Boylan, Auditor Public Service Railway, called attention to the standard classification of accounts as an answer to how the matter of what is included in the tax account should be interpreted to commissions. Mr. Boylan said that if accountants would always emphasize that their accounts are kept as defined in the Interstate Commerce Commission text there should be no difficulty.

Mr. Hopson pointed out that income tax is a part of the tax account and should be subtracted the same as other expenses before net income is figured. Mr. Hopson thought it was unfortunate that Congress refers to the present ten per cent and proposed fifteen per cent corporation tax as a "normal tax." Of course, a commission examines the operating account and a commission may disallow any tax item it may choose to disallow just as it may choose to disallow what it calls an excessive manager's salary or any other item of expense which it questions as being unreasonable.

Next on the program was the paper on "Construction Accounting" by W. L. Davis, auditor Lehigh Valley Transit Company, Allentown, Pa. This paper appears in abstract elsewhere in ELECTRIC RAILWAY JOURNAL.

CONSTRUCTION ACCOUNTING

C. E. Yost auditor and assistant treasurer, Wilmington & Philadelphia Traction Company, in discussing Mr. Davis' paper, said, in part:

"The manner in which Mr. Davis has handled the subject of construction accounting leaves very little for the rest of us to talk about. Every phase of the subject has not only been touched upon, to use his own language, but has been so clearly and completely set forth that if copies of his paper were put in the hands of all of our timekeepers, distribution clerks and bookkeepers, it would probably do more good than paying for special courses in accounting.

"It may be that the accounting department is at fault in continually trying to educate the various foremen and other employees from whom we receive the original records of material and labor distribution. In many cases after incessant hammering on the subject during the summer and early fall months, we see signs of embryo intelligence, but so soon as the first flakes of snow are scurrying through the atmosphere there comes an order from the operating head to stop all construction work for the winter, and before the accounting department is aware of any change in plans the 'hopeful' has gone from the property.

"Would it not pay in the end to have the accounting department furnish the necessary timekeepers and material clerks from our own force and keep them employed on some other work during the winter? No doubt the engineers in charge of construction work would resent having around on the job employees who would not be responsible to them. Yet how often do we find that on Jan. 1, the engineer himself has accepted another position and with him have gone valuable field notes and other data which he regards as his personal property.

"One of our Wilmington men once made a suggestion that each department keep a diary of its work throughout the year and in January turn them over to some one who would compile a complete history of the year's doings. While we have not taken up the suggestion, there is no doubt but that such a work if kept up each year would be invaluable fifteen or twenty years from now, especially at such time as a revaluation of the property might be required.

"The present accounting practice is to have various operating departments furnish assistance of various kinds at cost in the construction of new lines and extensions. No doubt the commissions would object to the inclusion of a profit on such labor, but if the work was done by an outside contractor not only would the actual cost be greater but the contractor's profit would be accepted without question as a proper capital expenditure. Reconstruction of existing lines should perhaps be excepted in taking profit on services rendered by other departments, but does it not seem unfair to compel auxiliary departments to do the construction work at cost and often at the expense of allowing their own regular work to suffer by reason of their transfer?

"There are no doubt numerous cases where in the past, especially during a change in ownership, capital has been charged with items which were at least questionable, but the practice now seems to be that when reconstruction is necessary, operating expenses should stand as much of the cost as possible. It is not fair, because a tie was in a certain place years ago and that there will be a tie in the same place after reconstruction, that the cost of the new tie should be considered as maintenance. If your roadbed was reconstructed in 1920, you should be entitled to a return on the actual present cost of the new road with ties at $1.50 each rather than 25 cents for those placed in 1900 and on labor at 50 cents per hour rather than the 10 cents or 12 cents paid twenty years ago for the original installation. It seems that we owe some consideration to the stockholder as well as to the bondholder.

"We are very apt to look with disdain upon the simplicity of the old methods of accounting, yet with all of our ingenuity for creating suspense accounts, sub ledgers, work orders, executive authorizations and control accounts, it is doubtful whether the accountant of 1950 will be able to glean much more essential information from our books than is found in the records of the previous generation. The supporting records will be so voluminous that in time they will be considered as junk and destroyed, leaving only the control accounts in the general ledgers.

"Most of our electric railway systems have gone through several consolidations, each one producing its crop of connecting special work and short links of track so that without maps distinctly showing the ownership of each foot of track, it would be impossible to tell what property is covered by the various bond issues. These maps should be made in sections and reduced to sheets 8½ x 11 in. for convenience in binding. One set should show all of the various items of material used in the construction of the track and overhead with as much information as possible concerning the type of the material used, by whom manufactured, etc. Another set should show the various deeds or rights of way together with notation of fencing, crossings and other requirements as to where same can be found both in the company's document files and in the county offices. On a third set of these maps should be shown each time the property was reconstructed, the job order on which work was done and the cost thereof. These sectional maps bound in book form would be worth their cost several times in their convenience and time saved over an ordinary index to locate the proper agreement relating to any section of property or the necessary details for the write off if retired from service or reconstructed.

"One other suggestion I would like to make and that is, the establishment of some method of segregating in a special memorandum all costs, no matter in which classified account they may be charged, pertaining to expenditures made for the benefit of the community as a whole and which may be considered as taxes, such as street paving, assessments toward the building of bridges, relocation of sewers, etc. While a great deal of money has been spent for these purposes in the past the amount which cannot be accurately determined, we can make a start now and it will be surprising how large will be the total in the next few years and it may be the means of preventing considerable increases in our future tax burdens."

Wednesday's Session

The greater part of the Wednesday afternoon session of the Accountants' Association was taken up with joint meeting with the T. & T. Association, the report of which was published in the issue of Oct. 8 in connection with the report of the T. & T. Association. At the end of that joint session the accountants reassembled for their final meeting.

After the meeting had been called to order, Mr. May, of New Haven, urged greater interest in the Question Box in *Aera*. Mr. Glover indorsed Mr. May's suggestion, and said that he had urged accountants to take an interest in the Question Box, but it fell flat. Continuing, he said that members of the association do not always take the trouble to answer letters. M. R. Boylan explained that many of them have been tied up in rate cases which have been frequent recently.

The chair then announced that W. L. Davis would probably be the representative of the association at the Atlanta convention.

The report of the committee on resolutions was then presented by M. R. Boylan. The thanks of the association were extended to the parent associations, its committees, the chairman of the program and other committees of the Accountants' Association, the technical press and the speakers at the Accountants' meetings.

The committee on nominations then presented the following as officers for the ensuing year:

President, Frederick E. Webster, vice-president and treasurer Massachusetts Northeastern Street Railway, Haverhill, Mass.

First vice-president, W. G. Nicholson, secretary and auditor Omaha & Council Bluffs Street Railway, Omaha, Neb.

Second vice-president, E. M. White, treasurer Binghamton (N. Y.) Railway.

Third vice-president, W. A. Doty, auditor Denver & Intermountain Railroad, Denver, Col.

Secretary-Treasurer, F. J. Davis, auditor's department, Public Service Railway, Newark, N. J.

For members of the executive committee, J. J. Duck, general auditor Chicago Surface Lines; R. N. Stevenson, chief clerk to comptroller, the Connecticut Company, New Haven, Conn.; Wallace L. Davis, auditor Lehigh Valley Transit Company; G. H. Caskey, auditor Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va.

These officers were unanimously elected. Each of the newly elected officers who were present made a short address, and the meeting adjourned.

C. E. R. A. Engineering Council Meets

THE first meeting of the Engineering Council of the Central Electric Railway Association was held in the association offices at Indianapolis, Ind., on Sept. 26, 1921. The purpose of this meeting was to formulate a working basis in order that the different local sections and the general organization might properly function. It was decided that the sectional meeting would be a one-day session only, to be held three times each year, the first meeting to be held some time during the first half of November, the second during the latter part of February and the third during the month of May. There will be one general meeting of the entire organization at the annual meeting of the Central Electric Railway Association, at which time a half-day session shall be allotted to this organization on the program. In the holding of sectional meetings it is the general purpose that each section send a representative to the meetings of the other sections, in this way keeping in closer touch with the work throughout the entire territory. All the meetings of the local sections will be in the nature of a round-table discussion, as it is believed in this manner that the members will be more spontaneous in the discussion of engineering problems and better results will be obtained. Questions for discussion are to be supplied by the various members attending, but as an outline for the first meeting questions have been proposed by the Engineering Council.

Another meeting of the Engineering Council will be held the latter part of November in order to go over the work of the various sections and formulate a report to be rendered at the annual meeting of the C. E. R. A.

Snow Removal Problems Discussed

AS A result of a recommendation for a discussion on snow removal made by Henry L. Doherty after last February's severe storm, the material handling section of the American Society of Mechanical Engineers in New York discussed this on Sept. 23. The discussion centered on various snow-removal devices, including mechanical loaders, rotary plows and snow-melting devices. Plans were presented for briquetting snow so as to reduce its volume and enable the material to be piled along the street in small areas. Mr. Doherty expressed confidence that a practical scheme would be developed.

Electric Railway Cost Accounting*

Manufacturers' Cost Accounting Systems Can Be Adapted to Electric Railway Operations to Determine Cost of Operation by Divisions or Routes When Results Obtainable Warrant Expenditure

By John H. Bowman, C. P. A.
Price, Waterhouse & Company, New York

"COST accounting" as the term is used in manufacturing describes a formal system of accounts wherein the cost of each product at each stage of its process is determined. There are two plans of cost accounting. The first may be called the "analytical" method, as it consists in analysis of the determined cost of the operations as a whole; the second may be called the "synthetic" method, as it builds up the cost of each operation separately as a collateral procedure to the compilation of the aggregate cost of operations.

Scientific cost accounting in manufacturing organizations is a development of the last twenty-five years. At first estimates of cost were thought sufficient, but as competition became keener it was found to be dangerous to rely only on these cost estimates. The desire to determine more accurately the annual profits also furthered the development of cost accounting. A further benefit, not fully realized at first, derivable from the cost records is the guidance that they afford to the management in indicating waste and inefficiency.

Modifications of Cost Accounting in Transportation

In the adaptation of the manufacturers' idea of cost accounting to transportation certain fundamental differences in the two lines of enterprise have to be kept in view. It is not unreasonable to conceive of transportation service as a commodity in the production of which the processes are comparable with manufacturing processes. To the manufacturer all of the information which he ordinarily requires is provided when he secures the cost of each of his products so compiled as to show the cost of each of the various progressive stages in its process; the factory cost before providing for selling and administrative expenses furnishes the figures required for inventory purposes and the full cost, those necessary for price fixing, etc. Transportation cost on the other hand, while it affords the necessary information for comparative study whereby losses, waste, etc., may be detected and localized, does not provide sufficient information to be of real value in connection with many questions of management policy, or for comparison with rates. The reason for this is that a very large element in transportation service consists in providing, for the use of the patron, exceedingly costly facilities in the form of road, equipment, etc. The value of these facilities is vastly greater in proportion to the actual cost of the service provided than the value which a manufacturing plant bears to the total cost of its output. The relative importance of this factor is, of course, widely variable in transportation enterprises according to the location of lines, the density of traffic and many other factors, but to indicate roughly how important an element it is, it may be mentioned that a study, made on the basis of pre-war conditions, for certain large electric and steam road properties, for which I was able to secure approximate appraisal values of the property, indicated that a return of 1 per cent on the value of the property used in operations was equivalent on the average to about 5 per cent of the total operating expenses and taxes in the case of the electric railways chosen, and to a substantially larger percentage in the case of the steam roads. The data, therefore, which an electric railway company needs are not plain cost data, but should include also corresponding data relative to return on the investment. It is neither necessary nor desirable in the practical application of this principle to merge the two sets of figures at any point.

JOHN H. BOWMAN

Another fundamental difference between manufacturing and transportation cost accounting lies in the fact that the product in manufacturing is the commodity which is sold, whereas the product in transportation is the service provided, which may or may not be sold according to whether or not the traffic offers itself. Still another difference lies in the nature of the product and processes and the consequent methods of apportionment of common expenses. In manufacturing much of the greater part of the expenses ordinarily consists of the material which enters into the product and the labor cost of fabrication. The remaining expenses are very largely in the nature of supervision or are so closely related to the processes of fabrication as to render direct labor cost a sound basis of apportionment of most common expense. In the case of transportation or of the electric railway, in particular, there are certain operations, such as power production or shop work, which are fundamentally of a manufacturing character and to which the principles of manufacturing cost apply, but in many of the most important apportionments, as say between individual lines, statistics of use afford a very much more nearly correct basis for apportionment than do labor costs. For example, if a section of track be used in common by two or more lines, the most nearly correct basis for apportionment of the cost of its maintenance among the lines is probably a composite of two factors, which are best described as "beneficial use" and "destructive use," a basis in which due consideration is given through the former factor to natural deterioration and through the latter to the relative track-wearing qualities of the cars operated over the several lines which use the common track. This principle bears on a considerable number of elements of transportation cost, which it is impracticable to take up in detail within the limits of this paper.

Other distinctions between the manufacturing and the transportation cost accounting problems could be developed, but those mentioned sufficiently indicate the fact that manufacturing cost methods cannot be transferred bodily for application to electric railways and that the cost methods for the latter must be developed along their own, though somewhat parallel, lines, and further should be considered always in conjunction with the element of return on investment.

Limitations of Cost Data Obtainable by Electric Railways

The possibilities in the application of cost accounting to electric railways are first, as regards the extent to which the operations as a whole may be subdivided into individual operations or "products" (if the manufacturing analogy be kept in view), and, second, as regards the minuteness with which the elements or "processes" which go to provide the service may be subdivided.

Considering the subdivision of the operations we may take, as an illustrative case, an electric railway system operating both street and interurban lines and maintaining its own facilities for power production, car repairs, etc. On such a line the ultimate services rendered are, say the transportation of passengers and express over various lines. There are two plans under which the subdivision might start; first, by separation of the costs of different classes of service, and second, by subdivision by districts of the costs of handling all traffic. In any separation by classes of the cost of handling traffic over the entire system, where a considerable part of the separation has to be made on district or line figures, it is reasonably apparent that the separation into classes should be the last, or almost the last, stage in a subdivision.

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*Abstract of paper presented at annual meeeting of American Electric Railway Accountants' Association, Atlantic City, N. J., Oct. 3-5, 1921.

The logical first step in subdivision, therefore, may be taken to be that into districts. Next, the service in a district is obviously the aggregate of services on numerous lines in the district, so that subdivision of the district into lines is the logical second step. The operation of each line is the aggregate service rendered by various car runs, some of which very likely may be operated for a shorter distance than others through the cars being turned at points short of the end of the line. It seems clear, therefore, that the logical third step in subdivision is into individual runs. It is hardly worth while following the logical subdivision beyond this point because it is doubtful whether there are many cases in which run costs are worth determining excepting as a means of separation by classes of traffic. Ignoring, then, possible further subdivision by movement, the final step is the separation among the various classes of traffic on the line, or whatever other unit the subdivision is extended to.

Turning to the question of elements of operation which go to make up the cost of the chosen units of service, it may be said that the classification of accounts, as prescribed by the commissions, must be used as a basis in order that the relationship of the cost and general accounting systems may be maintained. A certain complication, however, is offered by the various charges, which are becoming more and more frequent in common practice and which are provided for by the commissions, to effect an equalization as between years of certain types of expense. Notable illustrations of these equalization charges are the provisions for deferred maintenance and for accidents and casualties, according to the generally accepted theory of the present day, it is proper that provision should be made for maintenance charges when the maintenance itself is deferred and for accidents and casualties to provide as a sort of insurance against the more serious accidents which ordinarily occur only at intervals of years. The idea underlying this is primarily to avoid misleading the investor by reporting excessive net income when there is reasonable prospect of abnormally large expenses in a period to follow. It has the defect, however, of concealing the actual operations of the year, except to a mind trained to consider financial statements. For administrative purposes the prime concern is, of course, with the actual outlays and not with the equalized figures. Perhaps the most practical way of meeting this condition is the preparation of the company's monthly income accounts in three column form—the first to show the actual operating expense without equalization charges, the last to show the equalized amounts in the form in which they are presented in the published accounts, and the middle column to show the difference between the first and last, and thus reflect the net effect of the equalizing charges on the accounts of the month. Under this arrangement the cost accounting system will support the cost of operation as presented in the first column. In such a treatment of the problem, however, it is probable that an exception should be made in the case of depreciation as distinct from provisions for deferred maintenance. It would seem that depreciation, if on a sound basis, is more closely akin to actual outlays than are the other equalization charges or credits. This whole question of equalization charges, however, is an open field for consideration.

To summarize, it is practicable to formulate a synthetic cost system that will provide the cost of the traffic as a whole, or of each class of traffic over each district or individual line, or even individual car run, and (provided a detailed valuation of the properties is available) to show collaterally the corresponding return on the investment in facilities used in the operation. It is practicable in the course of this compilation to maintain cost accounts for each individual sub-unit of operation, such as power production, car repairs, etc., and for maintenance in as much geographical detail as is desired. Finally, it is practicable to maintain these cost accounts in such a way that the aggregate cost of all of the services provided for carrying the several classes of traffic over the several lines in a given period will equal in the aggregate the total cost of the transportation service provided by the company.

BENEFITS OBTAINABLE BY THE ELECTRIC RAILWAY

The facilities afforded through cost accounting cannot be listed in detail as almost every company has problems of its own which may be met by this means, but the most important will probably fall under one or other of the following four classes:

1. Comparisons of costs with tariff rates or other revenues to disclose whether and to what extent a service is profitable, or the reverse, and why it is so.
2. Comparisons of details with those for other services, or for the same service in other periods, to localize losses through waste, irregularities, incompetence of sub-officials, or mismanagement and to facilitate and guide administration generally.
3. Information for use in connection with existing or proposed contracts or negotiations.
4. Information for board or stockholders or for publicity.

Comparisons of costs with traffic rates is the logical development of a principle that has been recognized in cases before courts and commissions for many years but, in the lack of adequate cost data, it has either been confined to the cost of the operations of a group of lines as a whole or has been developed by an analytical cost study, which is usually difficult to establish to the proper satisfaction of the judges or commissioners if, as is usually the case, there is active opposition.

Whether or not relinquishment of the plan of averaged fares within the cities, under which the street railway systems, as distinct from the interurban, have grown up, is under consideration as a possibility, it seems almost self-evident that for the information of the management full particulars should be available to show the profit or loss on the operation of each line.

The calculation of return on the investment in property used in operation, made along with the cost computations and accompanying them, contributes materially to the value of the results by lines. There are obvious advantages in making these return calculations on the basis of 1 per cent on the value of property used in the various operations, inasmuch as this rate involves a simple calculation and does not commit the company to any fixed rate of return as being an adequate one. There is a variation in what constitutes a fair rate of return from year to year and what is a fair rate from one point of view may not be a fair rate from another. The results can be converted to any rate desired by mere multiplication.

The possibilities of the use of costs for comparison of one service with another or with the same service in another period increase up to a point, with the minuteness of detail, but apart from the limitations of expense, cost details can be carried to a point where they cease to be useful for practical purposes. For ordinary use in comparisons the computations of return do not add much to the usefulness of the detailed cost data, but when the broader policies of operation are under consideration the return data may become of prime importance. For example, if there is a question as to the best location for a new carhouse as between two points, one at a central point in a city and the other at a somewhat out of the way point, it is obvious that the comparison to be made is between the additional operating cost entailed by the out of the way location and the additional return element resulting from the greater investment in the central location. The value of cost data in connection with the arrangement of a joint facility or lease agreement needs no argument and it is obvious that the element of return must be available along with the cost data to render them of best use in such cases. In matters such as negotiations with a city over a franchise involving maintenance or other undertakings, or in negotiations with labor organizations, detailed cost data are of more or less value according to circumstances.

For the purpose of information, whether for the use of the board, or the bankers, or for the publicity department, it is doubtful whether as a general rule it is necessary to add materially to the information which is made available by the cost accounting system necessary to provide the benefits already described. Further data required for any of these purposes can be better made by special cost studies.

There are certain underlying principles that must be met if the system is to be of value. These are, first, that there must be an ultimate allocation of all expenses without duplication; second, that the cost accounts must be built up logically and intelligently step by step, and, third, that the system must be a continuous one consistent in its methods from month to month.

One procedure whereby cost computations can be made is along the lines that have been prescribed by the Interstate Commerce Commission for steam railroads. The development of this procedure is traceable through certain decisions of the Wisconsin Commission in 1907 and 1908, through computations by the Post Office Department relative to various mail service costs in 1909, and to its promulgation in 1915 by the Interstate Commerce Commission as a basis for the separation of freight and passenger train expenses on steam railroads. This procedure applied to electric railways would call for successive subdivisions and apportionments until the desired degree of detail should be attained. In the first subdivision expenses would be allocated direct to the operating units if directly assignable, and if not they would be treated as common expenses. Common expenses would in turn be apportioned among the various operations on the basis wherever possible of ratios determined from closely related statistical data, item by item, and finally those not apportionable in this manner would be treated as general overhead expenses and apportioned on some general basis such as the ratio of the other expenses of the group to which they pertain, or as a whole. Further reapportionments along similar lines would perhaps have to be made for further subdivisions as has already been noted. This method is distinctly an analytical one. For special cost studies, or for approximate regular determinations, it serves fairly well provided the object is merely the entire cost of each of the several services. The method does not afford the sort of detailed information that is necessary to furnish really valuable aid for adminstrative purposes. To secure data which will be useful the synthetic procedure, which has already been roughly outlined, seems to be requisite. In a synthetic method it is possible to avoid the progressive compounding of the elements of error that are unavoidably entailed by averaging or other arbitrary apportionments.

COST FROM SUB-UNIT ACCOUNTS

In the practical installation of a synthetic system there should be opened a cost account for each principal unit or sub-unit of operation, to which charges are to be made direct from the vouchers, payrolls, etc. At the end of the month the process of closing the sub-unit accounts entirely into the principal unit accounts should be effected sometimes, perhaps, through the opening of additional sub-unit accounts for assembling and distributing costs. In all of these accounts provision should be made for cost figures and for the 1 per cent return on the investment in parallel columns. In closing out the sub-unit accounts the use of performance or statistical data would be necessary and provision should be made for the careful compilation of what data of this type are to be required. In some cases mechanical devices would be found worth while, as for instance in the matter of the consumption of power. If operating conditions as regards grades, loads, etc., are practically uniform over the lines of a system, it would probably be correct to apportion the power consumption on a car-mile basis over the lines, but according as the conditions on the several lines become more and more dissimilar the importance of ascertaining the actual power consumption on each line increases and the benefit derivable from the installation of the necessary devices to determine such consumption becomes more marked. As has already been mentioned, statistical data involving the traffic that is actually offered should be avoided in cost computations. It should be kept clearly in mind that the cost of the service provided is the immediate aim and that the traffic that offers itself is a factor distinct and separate. Neglect of this principle introduces one of the most confusing of all types of variation in cost data, namely, the composite result of two variables.

Perhaps the most practical question in the whole cost problem is that of how to establish a scientific cost accounting system without a radical increase in the expenses of the accounting department, the justification for which cannot become evident through results for some time after the increase begins. The formulation of a standard system by a committee is not at this stage of experience a procedure to be advocated. It is better that each of the more progressive companies should develop its own system to a point and thereby be in a position to discuss, knowingly, the problem of standardization, which can then be advantageously assigned to a committee for recommendations. Meanwhile general discussion of the basic principles and procedure is invaluable.

Gradual development of a scientific cost system along synthetic lines is practicable because of the elastic character of the synthetic plan. To a great extent the shop and power cost systems which are now commonly kept can be incorporated in the system with a minimum of change for the time being, and pending the full development of the system many apportionments can be made approximately on an analytical basis. For example, the distribution of power cost may be made temporarily on, say, a car-mile basis and the basis of actual consumption deferred to a later stage of development of the details of the cost system.

The simplest practical plan would perhaps consist in, first, choosing as principal units of operation, not each line, but a limited number of distinctive lines, the costs for which gave reasonable promise of affording especially valuable information, and treating the other lines as one or more groups. Separation of cost as between classes of traffic might be undertaken at this stage or not according to the local importance of the question. Cost accounts would, of course, have to be kept from the outset with the more important sub-operations, such as power production, car shops, carhouses, etc., but the distribution of these charges might be made for a time on an average cost basis direct to the principal units of operation.

The services and activities reflected by the general and overhead expenses, which are also most conveniently to be treated as sub-units of operation for cost purposes, could be similarly apportioned. The results would be a fair approximation of the cost of operation of each principal unit and should aggregate the total cost of operation. The basic plan would be synthetic, but many of the steps analytical, and while the profit or loss on operation of a chosen unit would be indicated approximately, the details would be of but limited value as a means of administrative control of operations.

Offsetting the shortcomings mentioned would be the facility with which more precise methods and further subdivision of operations could be substituted one by one without disturbing the continuity of the system. Similarly as regards the element of return on investment, provision should be made from the outset for return computations along with the cost figures, and used if the figures are available. If not, a partial computation may be practicable. Most companies, for example, have the investment value of rolling stock at least. "Car service" must be provided for as a sub-unit of operation to be charged with maintenance, cleaning, supplies, housing expenses, etc., and the total cost distributed among the several lines on an appropriate basis. If valuation data are fully available, there should be shown in the space provided for return on investment, the figures in respect of the cars themselves, the shops, the carhouses, etc. If the valuations are only partially available, it may be feasible to base on actual figures the return on the investment in equipment and on rough approximations, that on the investment in shops, carhouses, etc., which are properties of a type for which some sort of value estimates are nearly always on hand.

CONCLUSION

It is imposible with so broad a field to do more than sketch an outline of the thoughts that seem to have a most direct bearing. There are certain principles which I have endeavored to develop which seem entitled to special consideration in the development of a general plan of cost accounting for electric railways and I shall conclude this paper by repeating them.

First, what the electric railway needs

to correspond to the cost accounting system of the manufacturer is what may, pending the discovery of a better term, be described as a "value accounting system," embracing not only the determination of the costs of the various services but also the return on the investment in property used in rendering these services.

Second, that the electric railways through cost accounting methods can practicably secure benefits of great value.

Third, that in the formulation of a cost system the attractions that are offered by the analytical method are by no means equal to those offered by a synthetic procedure, which, in addition to being more accurate and more illuminating in its results, is more elastic and, therefore, better adapted to gradual establishment as a part of the company's accounting system.

Finally, it must be borne in mind in all considerations of costs or their derivation that cost figures are approximate and not absolute. The more minute the detail with which they are prepared and the more we come through experience and study to understand them the nearer they can be brought to the theoretical, though never quite attainable, true costs, which we are always seeking to obtain.

Construction Accounting*

The Author Outlines the Practice to Be Followed from the Beginning of the Work to Its Conclusion and Points Out the Pitfalls to Be Avoided

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THE charges to construction costs may be divided into direct and overhead.

In direct charges, the fundamental principles of distribution should receive earnest attention. The most elaborate accounting and cost systems, together with the most complete classification of accounts, are absolutely useless without a thorough knowledge of the elementary differences between construction and operation on the part of those responsible for the distribution of accounts. In this connection, it may be said that the foreman (to whom is often delegated the duty of assigning account numbers to payroll and material records) is not an accountant nor even a bookkeeper, and cannot be expected to be an expert along those lines. However, this condition can certainly be obviated to some extent if he is carefully instructed as to fundamentals, and if he has the opportunity of receiving from the general office advice along those lines. It is clearly the duty of the chief accounting officer of an electric railway to see that the matter of distribution is properly cared for at the source, and if this is accomplished, some of the problems involved in construction accounting will have been solved. In a large corporation this responsibility must necessarily be delegated, and the time of one man, if not more, can be profitably spent on the subject.

W. L. DAVIS

Another matter which is of considerable importance (and often of trouble) is the education of those responsible for original records from the field along the subject of proper description of labor performed and of material used. If the work is not described properly, or, as is sometimes the case, not described at all, errors in distribution and inaccurate cost analyses will surely follow. This feature may present some practical difficulties, but they can be reduced to a minimum by means of careful and constant supervision on the part of the accounting department.

The educational work should not be confined to the field offices and field supervisory employees but should be extended to every employee of the accounting department as well. The employees in the general office should not be expected to be familiar with physical conditions to any great extent, but they should have a thorough knowledge as to what construction means and should be able to identify charges which are clearly in error and which have been erroneously distributed by someone else.

The direct charges to construction accounts are made up of payroll distributions, material distributions, a proportion of the garage and stable expenses and miscellaneous items through the voucher record. The payroll and material distributions are originated by the construction men in the field, and the accounting department must rely to a great extent upon the accuracy of the basic charges, but these items should be investigated from time to time by the general accounting department, and tests of their accuracy should be made. This branch of the work may be facilitated to some extent if the payroll and material distributions are summarized in the general office, but if the organization of the company provides for this work to be handled in division or district offices, considerable outside accounting supervision is necessary. A portion of the garage and stable expenses should be allocated to the construction costs, with due regard for commission requirements, and this result may be obtained by a monthly distribution of the automobile costs, based upon the mileage records. The garage and stable expense account should be carried as a deferred item and cleared to the various accounts as soon as the monthly mileage is determined. It may be necessary to carry this account over the closing period as a suspense item, and in such a case the suspense account will be cleared in the following month. The charges to garage and stable expenses may be subdivided in order to arrive at such detailed costs as may be considered desirable, but this feature is not absolutely necessary. A number of charges to construction are made on special vouchers, and these items of course can be readily distributed and charged to the proper accounts through the accounts payable record.

DISTRIBUTION OF OVERHEAD COSTS

Indirect or overhead construction costs should receive most careful consideration, as it is just as erroneous to pursue an ultra-conservative policy as to make mistakes in the opposite direction. Construction costs should clearly include some general expense items other than such charges as are made direct, the most important item being interest. This can easily be provided for during the time of construction and before the property is turned over to the operating department, as construction funds used during that period are usually borrowed for the purpose and the cost of this money is easily determined. When money is borrowed for a particular construction job and is not used for any other purpose, the capitalization of such interest does not present any difficulties. If, however, funds are borrowed for general construction purposes, and not for use on any one piece of work, the question of proper allocation will naturally arise, and the monthly accruals or amortization of interest may be charged to the various construction jobs in the ratio that the various direct charges during the same periods bear to the total. Still another circumstance may be mentioned (with particular reference to the troubles during the past few years), when the operating company is required to use its own funds, in the absence of borrowing capacity, to finance necessary and obligatory construction. In this case, it is clearly proper to include in the monthly charges to construction, an amount representing interest upon the money so used, this amount being credited to the interest account. This same procedure could be followed during the time that an operating company is providing for its construction requirements from its own funds pending the sale of bonds, which are usually certified and delivered by the trustee only after construction requirements as outlined in the mortgage have been fulfilled. If it is possible, however, for the company to sell its funded securities covering certain construction work before such work is completed, it may be possible to capitalize the interest thereon (less any interest accretions upon unused construction funds), but care should be taken not to duplicate interest charges. The rate at which the construction interest is taken into the accounts of an electric railway will depend altogether upon the cost of the money during the period of such construction.

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*Abstract of paper presented at the annual convention of the American Electric Railway Accountants' Association, Atlantic City, N. J., Oct. 3-6, 1921.

Other indirect costs which should be considered are represented by general salaries, general office expense, accounting department expense, purchasing and stores expense, insurance and the like. Although the classification dated July 1, 1914, states that no charge can be made for incidental services, it does permit the carrier to capitalize a proportion of such expense when employees devote a substantial part of their time to construction work. In such cases the company should determine the proper ratio represented by the time of its office employees and should apportion its general expense accordingly, with due regard, however, to any direct charges either to operation or construction which could be eliminated before the allocations were made. The cost of purchasing and the storeroom expenses may be allocated (with due regard for the requirements of the classification) upon the basis of the monthly storeroom issues. In arriving at the basis of such an allocation, however, it might be well to consider any items appearing in the stores distribution which might not be subject to a charge for purchasing and storeroom expense. Insurance may be allocated on a basis which would follow the consideration of the facts involved, but this may present some difficulties. In connection with liability insurance or workmen's compensation insurance, or other insurance based upon payrolls, the premium may be apportioned after analyzing the distributions of the payrolls upon which it is based, and applying the standard or policy rate for construction labor to payrolls representing construction costs. Other indirect or overhead charges should be allocated upon due consideration of the conditions.

HANDLING OF CONSTRUCTION COSTS

While it would be possible to charge construction costs direct to property accounts, it is far more desirable to handle them through the medium of construction authorizations, or, as they are sometimes called, authorities for expenditures, improvement requisitions, etc. Under these construction authorizations it would be well to issue supplementary work orders covering the charges to each property account, in order to facilitate distribution in the field. These construction authorizations and work orders should be prepared by the engineering department upon recommendation of the department head concerned and should show a complete description of the work to be done, estimate of cost, material on hand, cash required, reasons for expenditures, benefits derived therefrom, and any other information considered necessary or desirable. After being signed by the department head recommending the work and the chief engineer (or someone delegated by him) the work orders should be sent to the accounting department for verification of the distribution. This distribution should be based upon the description as given, and must show not only the approval of the chief accounting officer as to the total charge to construction, but the sub-classification as to property accounts as per the work orders. If a construction authorization describes a job which involves a replacement, a supplementary authority should be prepared and should follow the same course, on the theory that all new work be charged to property account in total, and the value of material retired or replaced in connection therewith be credited to property account in total. Upon receipt of the authority for retirement, the book value of the property should be determined. If this is impossible, an engineer's estimate as to the book value may be used, but his substitution should not be made unless absolutely necessary. If the construction accounts of an electric railway are kept properly, the book value of any plant unit should be available.

The accounting department will assign numbers to the construction authorizations and work orders, but will see that they bear the necessary executive approval before they are returned to the originating department. No construction work should be begun until the authorizations have been properly recorded and approved.

HOW THE WORK IS CONDUCTED

As soon as the work under an authorization is begun, the accounting department will arrange to keep a detailed analysis of its cost. All charges to the authorization must show the number of the work order and the property accounts affected, and will be reflected in the monthly payroll and material distributions accordingly. These distributions should be prepared in such detail as will enable the accounting department to maintain a monthly analysis which may be readily made to parallel the original estimate as reflected by the construction authorizations, and if this analysis is compared with the periodical progress reports usually prepared by the engineer in charge of the job, the charges may be checked at intervals before the completion of the work.

This analysis should take the form of a subsidiary ledger, controlling a general ledger account, reflecting the total cost construction work in progress, the subsidiary ledger being in balance with the general ledger at all times. The postings to this ledger should reflect as much detail as possible, but it may be difficult to accomplish this result in connection with the payroll and material charges without a detailed distribution. It will be found advantageous to incorporate in the payroll accounting system a method by which the time chargeable to any construction job may be analyzed in detail, and if this is done, it will be possible to reflect in the monthly analysis a complete description of such labor charges. This result may be effected by a columnar form used in the daily distribution of the time tickets with the various charges representing similar work being entered opposite the column showing the necessary descriptive information. A system of this kind would require a separate sheet for the charges to each account during a semi-monthly accounting period. Thus it may appear to involve some extra work, but the value of the monthly analysis of the construction charges will more than offset the additional expense. A similar method may be incorporated in the stores accounting system whereby the charges to each account may be summarized on a daily or monthly recapitulation sheet upon which the quantities of material might be posted opposite the description of each article, the totals being priced and extended at the end of the period. A summary of this kind would not only provide a permanent analysis of the material charges, but would also establish a much easier method of posting the credit side of the stores ledger.

In order to handle construction accounting properly in the general office, it is absolutely necessary that these monthly analyses be kept up to date. They should not only reflect the details of all direct charges, but they should also contain such proportions of the indirect charges as may be applicable to them, these entry charges being applied monthly. A simple method of allocating the indirect charges to the various work orders may be established by means of a separate construction authorization to which all indirect or overhead items should be charged during the month, this authorization to be cleared before the construction accounts are closed and the total thereof divided among the various work orders upon the basis of the direct charges thereto (with due regard for such conditions as may arise in connection with any work orders as would be chargeable with any specific indirect cost item). The greater portion of the indirect charges represent credits to various items in the operating expenses and fixed charges, and if such items are not credited to the income account and charged to construction regularly, a distortion of the former is sure to result.

As soon as the work in connection with an authorization is completed, the accounting department must be notified and steps should be taken to secure all outstanding bills pertaining to the job and enter them promptly. As soon as it is determined that all of the charges have been entered, the accounting department will prepare a cost analysis of the work and submit it to the engineering department for comparison with the physical data and the original estimate. If the final cost exceeds the original estimate, a supplementary authorization covering the difference must be prepared by the engineering department and sent to the executive department for approval before final entries are made to property accounts. When the cost analysis is finally agreed upon by the department head concerned, the cost of the work should be transferred from the "Work in Progress" account to the plant account.

The routine work in connection with an authority for retirement should be handled in a somewhat different manner. As soon as the accounting department determines the original (or estimated) book value the authorization should be sent to the executive department for approval, and then returned to the accounting department, where copies should be made and sent to the various departments concerned. The accounting department should assign a number to the retirement authorization, and should debit a special account under the construction authorization (offsetting the depreciation reserve) with the full amount of the book value, crediting it to plant account as soon as the property is taken out of service (this information being furnished by the department head responsible for the work), the cost of any work incidental to the removal of the plant material having been charged to the special account in the meantime. After the final disposition of the property, the amount realized should be credited to the special account and the difference charged to the depreciation reserve. If the depreciation reserve has been set up on the basis of the estimated depreciation of each property unit, and the difference between the plant value and the salvage value of the property retired be over or under the amount set aside for it, the balance would be properly applicable to operating expenses. This method is recommended in order to provide for a credit entry to plant account before the property retired has been sold or otherwise disposed of.

If the construction accounting records are kept up to date, and the monthly analyses compared with the progress reports made by the engineers performing the work, monthly summaries of the charges to the various construction jobs may be made to determine the cash requirements of the corporation.

Adaptation of Routine Accounting Results to Particular Uses*

Routine Accounting with a View to Obtaining Actual Instead of General Results Provides the Basis for Furnishing Cost Figures Pertaining to Construction or Operation

By H. C. Hopson, C. P. A.
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H. C. HOPSON

NOT so many years ago, street railway accounting, in fact all public utility accounting, was comparatively simple. It was accomplished with a limited force and required little beyond a knowledge of sound bookkeeping principles. Usually the rate of fare was fixed by franchise or by a specific statute and was seldom if ever changed. The properties were usually small and self-contained, and the practical operating man prided himself upon his ability to know all about the property by watching the people ride on the cars, maintaining constant contact with his employees, ascertaining how much cash there was in the bank from time to time, and giving the statement of receipts and disbursements a cursory examination "some time after" the close of the month. This "some time after" used to range from two weeks to three months depending upon the willingness of the accountant to put in extra time at night after he had finished checking and accounting for collections, counting transfers, making up payrolls, etc., which constituted his duties.

The type of accountant needed today in the public utility industry is a man capable of acting as a general business adviser who can stand on an equal footing with the lawyers, engineers and other technical men in the organizations. To be all that he ought to be and in order to be able to claim this standing in the organization, an accountant must be equipped to furnish the various kinds of information needed and to furnish it on short notice. I could not hope to set forth in detail all of the different kinds of records which a public utility accountant might keep to meet particular needs but will only attempt to cover some of the more general conditions which exist, not with a view toward urging the addition of any system blindly but instead in order that the suggested group of examples given may serve as a stimulus to constructive thought as to the instances where the idea involved in this paper, rather than the substance of it, may be made effective.

ROUTINE ACCOUNTING FUNDAMENTALS

Before dealing with particularities, there is a fundamental which should first be emphasized. Unless routine accounting is laid out on a sufficiently comprehensive scale you cannot, regardless of the time and money available, meet many particular needs. To illustrate: the time when you must prepare to furnish information as to the cost of particular service is from day to day, as the distribution is put on the vouchers or material issues. If this is not done, the only basis for the distribution of such costs in a few months is the recollection of those who approved them. Such a basis is of course entirely unsatisfactory, emanating from a department which is supposed to deal with provable facts. Having this in mind, it is well to say that the first and most important fundamental is that certain basic principles for the classification of items must be laid out and kept day by day.

A second point, is that so far as possible the routine accounting results which are summarized in the current monthly statement should be kept in such form that they will require as little restatement as possible. To illustrate: we all know that taxes, except possibly income taxes—and they ought to be—are treated the same as are operating expenses for purposes of testing the adequacy of rates. Yet, on the income statement for some street railways taxes are shown as an income deduction along with bond interest and to determine the amount of the remaining revenue available for a return upon the capital investment it is necessary to make a deduction. The statement might as well have treated taxes as a revenue deduction, as is customary, so as to show at a glance the amount available for return.

Similarly, we all know that the amount of the allowance for renewals and replacements frequently varies, being an item which is very largely dependent upon judgment, method of computation and other circumstances. Hence, in the comparative statements which we ordinarily set up, the amount included in operating expenses in one accounting period may be radically different from that in the other accounting period with which the comparison is made, thereby entirely destroying the comparison. As a general thing such reports must be taken from your books, yet it is impossible, if the best use of the routine accounting results is to be had, that in each particular instance the books should be examined to ascertain the fact, and perhaps the man who is attempting to make use of the statement has neither the time nor the knowledge of the intricacies of the reports to be able to assemble together all of the so-called depreciation items in order that he may ascertain the fact for himself. Hence, to get the best use of the routine accounting result for the particular purpose, an income account comparison should show on the same page in a convenient place the relative amounts included for renewals and replacements in the respective accounting periods. This saves time and makes the statement much more usable.

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*Abstract of paper presented at the annual convention of the American Electric Railway Accountants' Association, Atlantic City, N. J., Oct. 3-5, 1921.

INVENTORY VS. PROJECT CLASSIFICATION

There is another general observation with respect to harmonizing particular requirements with routine accounting. After the receipts and disbursements stage was passed, some effort was made to segregate current expenditures between capital and income but usually at the beginning all the capital charges were lumped into a single account. This lumping into a single account, however, did not suit anyone. It cast suspicion upon the legitimacy upon the whole capital account, and other than showing that the total charges, made in a particular period, were a given amount, it meant nothing. The engineer wanted to know how much a particular extension cost. The master mechanic wanted to know how much a lot of cars cost, or more difficult still, to know the cost of putting a new type of brake on a particular car or group of cars. The banker cared nothing about these details but wished to know the amount which was expended for rails, ties, ballast and paving, etc., or perhaps in less detail, the amount expended for track, rolling stock and power supply. The executive, being interested both in specific projects and also in group expenditures, wished information as to both.

The conflict between the advocate of the inventory classification and the project or job classification led in many cases merely to an unsatisfactory compromise so that it was not unusual to find on the balance sheet, representing work long since completed, expenditures of the same nature carried under both inventory and project nomenclature. Subsequently, with the advent of regulatory commissions, requirements were made enforcing the inventory classification. This led, in some cases to a complete abandonment of any routine accounting on the job basis, with the result that engineers and master mechanics attempted to inaugurate their own subsidiary clerical or accounting departments, which purported to keep so called cost records. This practice has been a bugaboo wherever it has appeared because of the many items of cost which they failed to include on account of the necessarily incomplete sources of information from which they were derived. This was and is entirely unnecessary. Such records can and should be kept in the accounting department without materially increased work if the work is initially laid out on the right basis.

The inventory or commission classification is known to all. It should be in the hands of every employee of the company who authorizes work or approves vouchers or material slips. This, therefore, is taken care of. For a project classification every well-regulated, economically conducted corporate enterprise today has a budget with systematically arranged authorizations, jobs or projects, known by ordinary numbers or decimal designations. The accounting department should have the key or master list and make it its business to see that all departments of the company, having to do with these matters, are advised of all existing authorizations, to the end that as expenditures are made, in addition to carrying distribution showing the proper commission classification account, they should also carry the appropriate project number.

AUXILIARY PROJECT RECORD

The results of the recorded distributions on the individual vouchers and material slips when assembled may be either kept for the time being in a construction work in progress account or debited direct to the appropriate road and equipment accounts, being distributed by journal entry at the conclusion of the work, or, as I prefer, "second posted" into an auxiliary project record which is in continuous balance with the net increase in the road and equipment account in the general ledger. The uses to which such data may be put are manifold.

There has been a great deal of argument between commissions and courts of late as to whether present value or original cost should be the proper basis for rate making. While this is a very important question a great many street railways would even now be very much pleased if they could have a recognized fair return upon their original cost and leave present value for the future. The great difficulty, however, is that the original cost of much of their property is subject to fully as much speculation as is claimed with respect to the estimates of their engineers. In such a case even if all the records are available, it requires perhaps a month to analyze the cost of the respective cars so that a simple list can be furnished giving merely car number and amount. I know of no means which affords as accurate a check upon a perpetual inventory, which is practically a necessity in any public utility where costs are made use of, than properly kept routine capital records.

THE ACCOUNTANT SHOULD LOOK INTO THE FUTURE

One of the elements most vital to the financial health of a public utility is an adequate structure of rates. Except in rare instances, however, adequate rates are only secured at a vast outlay of money and labor and in the face of what is sometimes very difficult and involved litigation. Sometimes this litigation and the studies attendant upon progressing it, consume so much time that the credit of a corporation is seriously impaired before relief is secured. Therefore, one of the first duties of the accountant should be to grasp in a broad way and set before his executive officers the need for additional revenue before such need becomes acute. This need for revenue may be on a system as a whole or merely on one of its parts. If the accountant is to be the business adviser a detailed study of revenue and cost trends should enable him to anticipate the net results from operation from three to six months in advance.

Assuming for a moment that the accountant has demonstrated that with the existing rate of fare the revenues will be insufficient to provide the requisite fair return, it becomes necessary to collate data in such a way as to sell the idea to the regulating authority. In this, the importance of the work of the accountant cannot be regarded too highly. To have its maximum value and effect before a regulatory body, it should be exact and correct. The psychology of rate litigations is such that there is a great deal of magic in the word "actual." For an accountant to state on the witness stand that the results which he is presenting are actual, frequently produces a distinct sense of relief and sympathetic consideration on the part of the judicial officer who is hearing the case. In view of this, the keeping of records upon an actual basis is not only highly desirable, but is apt at any time to be worth a great many more dollars than are expended upon it.

Most public utility accountants have considerable experience and training in the keeping of revenue records upon an actual basis and little need be said on this subject. There doubtless are instances however where an advantage can be gained by devoting a little attention to the subject of a better arrangement for the keeping of revenue records by geographical subdivisions of the property or by such natural subdivisions as suggest themselves in the light of possible revisions in tariff structures. In given cases where it is not, methods may be adopted whereby revenues collected on interurban cars within the confines of cities and fares collected on suburban runs by cars which also operate on city lines, might be devised and made effective use of.

In connection with operating expenses, there is even greater opportunity for the effective use of actual results than in the case of revenue. Public utility commissioners and judges who hear cases of this character cannot but be impressed when evidence of operating costs is presented from the standpoint of actual outlay, especially if they have been listening to a good deal of testimony upon so-called allocations of expense on a per car mile or other basis. There will always be some expenses of a general character which must be allocated upon a more or less arbitrary basis, but it is frequently possible to isolate certain expenses of this sort so that the element of approximation will enter to a lesser degree than it would otherwise. Where operating costs as a whole are arbitrarily divided by car miles, car hours or any other of the generally utilized media for allocation, it almost inevitably follows that one branch or the other of the company's business suffers and not only does it suffer in fact, but in a controversy in which so-called facts thus arrived at were severely disputed, a whole case might suffer even more. In the following I will refer to some of the things which may be done to obviate this condition.

THE JOB ORDER SYSTEM FOR ALLOCATION OF EXPENSE

It is possible without tremendous effort to keep all of the maintenance of way expenses upon an actual basis through the adoption of the job order system which would cover all maintenance work in a given district for each year. Where this simple method is adopted, no allocation of direct maintenance of way expenses whatever is necessary except, possibly, the time devoted to superintendence, which is small in relation to the aggregate.

In the case of maintenance of equipment expenses, subdivisions are frequently kept, usually by car units. These can be tied into the respective classes of service and districts from a knowledge of the equipment units utilized. Further attention to this feature cannot help but develop means by which even more exact segregations can be made.

Power expenses are frequently apportioned upon an arbitrary basis and the best that can be said for some of these allocations is that they might be right. A careful study of this situation will disclose, in some cases, that the location of the company's transmission or distribution lines was such that it would be possible to measure the amount of current utilized in the operation of each of the property's major subdivisions.

The most frequent method of allocation employed in connection with transportation expenses is a subdivision on a car hour basis. As regards wages of motormen and conductors, this method of allocation is probably better than any other, the only possible criticism being that it might not accomplish a correct allocation of the amount paid for extra time. There are many expenses in the transportation group, however, where exact results are not secured if only this car hour basis is used.

Traffic expenses are usually of minor importance and need not be referred to specifically.

The element of joint cost is more present in the group of expenses coming under the head of "General" than elsewhere. This is not true, however, of all of the general expenses. On many properties officers whose compensation is chargeable under the general group, have specific duties which they perform in connection with separate parts of the property. This is particularly true of many of the clerks. Most of the clerical compensation is charged to General Expenses. Of course if some effort is not made, a little care used, legal services may come in in the form of a lump sum bill once in a year, with no satisfactory segregation. When the importance of being able to assign actual costs to the particular services becomes clear to the legal advisers it is possible to get a reasonably satisfactory segregation of bills.

Insurance, particularly insurance against property damage, can be readily segregated where there has been a valuation of the property. Injuries and damages almost always can be separated. In fact the surprising thing about these so-called joint costs is that while when first surveyed they seem to be almost all joint, upon analysis of the individual items, a sound logical basis for allocation of many of them becomes apparent to even junior clerks to whom cost accounting is a stranger.

Taxes usually fall into two general classifications, those relating to a specific property and those levied upon the corporation's rights to do business as a whole or upon the results of its operations as a whole. The taxes levied upon specific items of property can usually be allocated directly to the services to which those properties are devoted. Even taxes of a more general character can usually be subdivided upon some basis of fact and even if they cannot be exactly subdivided, they certainly can be allocated upon a more correct basis than would otherwise be the case if a correct statement of fact as to the company's situation and income (for each of the company's respective parts) has been maintained.

SEGREGATION OF PLANT ACCOUNTS IS ESSENTIAL

In addition to the necessity for keeping operating results in such a manner as to record actual rather than estimated facts very real advantage can be secured by a proper segregation of the plant or fixed capital account. The ideal arrangement would be where the fixed capital investment in each zone was carried separately and could be set forth on short notice. (The word zone here used is intended to mean any natural subdivision of the property for which a separate fare might need to be established.)

In most rate proceedings, two elements in connection with the physical property are usually considered. One is the actual cost or investment, and this is peculiarly within the province of the accountant to demonstrate. The ascertainment of the value of the property usually falls to the lot of the engineer. Experience has demonstrated that the accountant with his set of well kept records showing actual costs of actual property can be of inestimable value to the engineer in aiding him to ascertain the property's value.

While all the foregoing matters have their definite place and value in rate proceedings, the use of these data is by no means limited to proceedings of this kind. They can be made to locate operating efficiency or inefficiency and the causes responsible for either. They can also be utilized effectively in instances where unwarranted demands are made for additional service, where it is desired to postpone burdensome street repairing or repaving requirements, where prospective or existing jitney competition must be met, in instances where there is public clamor for extensions which are bound to prove unprofitable and in other instances too numerous to mention.

COST ACCOUNTING WILL GIVE THE BEST RESULTS

To accomplish the best results, the street railway accountant should always seek the unit and maintain his records so that the function and relation of the unit to the whole can be ascertained. This suggestion savors of cost accounting but that is one of the more recent developments of street railway accounting. The unit to be used, whether it be the line, the zone, the division, the type of track, the car or the repair part, should be carefully selected with a view toward the present and future requirement of the particular property involved and its problems. After the unit has been selected, it should be adhered to with reasonable consistency. It is only in this way and through the use of comparative units and periods that the best results can be secured. To do the most effective work along these lines, the accountant should be in complete control of the accounting situation, subject only to executive direction.

Regulation has its faults, but it also has its advantages, and not the least of these is that it has taught the sponsors for and participants in the electric railway industry that this industry is a business and a very real and essential business. The successful operation of a successful business contemplates that at the end of each operating period there will be left an adequate amount of wages for the dollars which were employed in producing the service which was furnished. Here lies a duty which devolves particularly on the street railway accountant who should do his utmost to insure that this net income will exist and will continue to exist. He is not only the watch dog for the company's receipts, but should also be the critic of its expenses.

Utility Commissioners Urge Improved Methods in Electric Interurban Operation

National Association of Commissioners Opposes Government Ownership and Discusses Safety Methods on Interurban Electric Railways and Post-War Regulatory Problems

THIRTY-TWO states were represented at the opening session of the annual meeting of the National Association of Railway and Utility Commissioners, held in Atlanta, Ga., on Tuesday to Friday of this week. James A. Perry, president of the association, vigorously opposed centralization in Washington, in the Interstate Commerce Commission, of control over all railroad rates, thereby destroying the power of the states to regulate their domestic commerce. In discussing the local problems of utilities, such as electric light, street railway and gas companies, Commissioner Perry asserted that the rates have been too low, generally speaking, throughout the country for the past two years, and he predicted that a continuance of this policy of dealing with local utilities will very soon drive capital entirely away from utility investments, if, indeed, it has not to a large extent already done so.

PUBLIC SHOULD REALIZE UTILITY SITUATION

The time has come, declared Commissioner Perry, for the public to realize that it is equally interested with utility stockholders in adequate service and adequate returns upon the value of the properties devoted to the public use. It is time for the public to realize that community growth is dependent upon utility growth, and that utility growth is dependent upon the investment of capital, and that investors of capital will not put their money into utility property when utilities are not allowed to earn as much as the legal rate of interest in the states where they operate.

Public or government ownership was strongly opposed in the report of the public ownership and operation committee, and after an exhaustive inquiry into matters concerning government and private ownership, both in the United States and abroad, it went on record as favoring privately owned and privately operated public utilities, with the proviso that all utilities should have public regulation.

> "Such regulatory governmental bodies, however," the report said, "must be sufficiently wise and fair and far-seeing to stand between the utility in question and unthinking, hasty public clamor not based upon full knowledge and careful thought. They must operate successfully in order succesfully and adequately to fulfill their duty of service to the public.
>
> "It therefore follows that, in order to maintain a just, equitable balance, and even to keep such utilities out of bankruptcy, it is necessary to maintain their higher rates longer than would to the layman seem necessary judging by the surrounding decline in commodity prices. To follow any other policy would be to put such utilities out of business and to discontinue that service to which the public is so justly entitled and which is now more necessary to the return of the vast bulk of private business to the desired goal of normalcy."

Improved safety methods in the operation of interurban electric railway lines were strongly urged by the committee on safety of railroad operation, whose report was devoted to a discussion of interurban electric lines.

As pointed out by the committee, the interurban electric lines have become important factors in the transportation system of the country, but "there has not been adequate advancement or improvement in operating methods or practices, with the result that many such systems, particularly trunk-line railroads, are today operating under primitive street railway rules and regulations which constitute a serious menace to life and property."

SAFETY METHODS RECOMMENDED

As the first requisite of safety on interurban electric lines, the committee recommended the adoption of time-tables and the strict requirement that motormen and conductors learn them thoroughly; next, that the double-order system of dispatching trains be put in effect on all important lines, this system consisting in the issuance of all train orders in writing and in duplicate, one copy going on the dispatcher's file and one being delivered to the crew.

The committee recommended that the block system be required on all electric roads where two or more trains are operated simultaneously, indorsed very highly the use of platform doors, preventing the ingress and egress of passengers until cars have come to a full stop, and particularly stressed the importance of careful selection, training, supervision and probation of motormen and conductors.

PROBLEMS OF REGULATION DISCUSSED

Wednesday afternoon was devoted to a round-table discussion on after-the-war phases of regulation, presided over by Henry G. Wells of the Massachusetts commission. In opening the discussion he pointed out that regulation should not penalize efficiency and place a premium on inefficiency. He referred to financing of utilities as one of the great problems and related how a solution was brought about in his state by adequate legislation. Other commissioners dwelt on the need of fairness and truthfulness in presenting cases to them in order to inspire confidence in the basis for the argument of the utility. Customer-ownership companies were viewed with much favor by commissioners and considered to afford a solution to a part of the financing problem. They urged that harmony be sought by every method.

On Wednesday evening a banquet was tendered the association by the Presidents' Club of Atlanta, which is a club comprising presidents of some fifty-two civic bodies. Mell R. Wilkinson was toastmaster, and addresses were made by prominent business men, including Carl D. Jackson, president-elect, and James A. Perry, retiring president of the association; Hartford Powel, editor of *Collier's Weekly*, and Joseph B. Eastman of the Interstate Commerce Commission. Arrangements for the banquet and other entertainment features were carried out by J. Prince Webster, formerly a member of the Georgia Railroad Commission.

Thursday's and Friday's proceedings will be reported in a later issue of the ELECTRIC RAILWAY JOURNAL.

Conference on Railroad Ties

A CONFERENCE on railroad cross ties and switch ties is to be held on Tuesday, Oct. 25, 1921, at 11 a.m., in Room 206, Atlantic Building, 928 F Street, N. W., Washington, D. C. The purpose of the conference is to decide:

1. Whether the unification of specifications for railroad cross ties and switch ties shall be undertaken.
2. If so, what the scope of the work shall be.
3. How the work shall be organized.

The details of existing specifications will be discussed in order to develop the lines along which the committee organized to carry on the work will consider the problem under the various local conditions.

This conference has been called in accordance with requests received by the American Engineering Standards Committee from the American Railway Engineering Association and the Forest Service of the United States Department of Agriculture for a conference of the bodies interested to determine the desirability of undertaking the standardization of a specification for railroad cross ties and a specification for railroad switch ties. In connection with its request for the conference the Forest Service made the following statements: "The railroads of this country use in the neighborhood of 100,000,000 ties per year. Before the war there was a wide variation in specifications. Much was accomplished toward standardization during the war, and since then further progress has been made. The American Railway Engineering Association and the National Association of Railroad Tie Producers have both adopted standard grades for railroad ties. The Forest Service is, of course, interested from the standpoint of conservation, as well as from that of standardization of forest products."

Invitations have been sent to the following national organizations: American Electric Railway Association, American Railway Engineering Association, American Society of Civil Engineers, American Society for Testing Materials, Forest Service, United States Department of Agriculture, Hardwood Manufacturers' Association of the United States, National Association of Railroad Tie Producers, National Hardwood Lumber Association and National Lumber Manufacturers' Association.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Des Moines Franchise Presented

Measure Looking to New Deal Provides for Sliding Return and Graduated Fares

Negotiations looking toward the end of the Des Moines railway controversy received a serious set back during the week ended Oct. 15 through failure of the owners of the Des Moines City Railway and the McKinley interests to arrive at an agreement relative to the power clause contained in the proposed railway franchise. Local officials of the Des Moines Electric Company, which is owned by McKinley interests, announced that inclusion of a power clause in any new grant to the railway would mean increased electric rates in Des Moines. They opposed the inclusion of the clause in the grant.

Members of the City Council sided with the McKinley representatives and at the session of the Council on Oct. 10 passed a resolution instructing the Corporation Counsel to notify the railway receivers that the power clause must be eliminated. The Mayor and members of the Council declared that the section as to whether the Des Moines City Railway is to be empowered to sell light and power should be submitted to people separately from the franchise. However, when the final draft of the franchise was presented on Oct. 12 the power clause remained.

M. H. McLean, representing the Harris interests controlling the Des Moines City Railway issued a statement on Oct. 12 to the effect that the company's reason for desiring the power clause was that the rate of fares may be reduced through the profit from the sale of surplus power. He called attention to the fact that the franchise would not permit earnings on the common stock until the fare had been reduced.

Mr. McLean further stated that in the past the railway had received applications for the purchase of power from it and that the company desired to take advantage of the legitimate demands which exist. He emphasized the fact that the Harris Company did not want to engage in the light and power business in competition with the McKinley interests. He also stated that unless his company was permitted to use its full facilities it could not be compelled to put new money into the property.

The final draft of the franchise, which has been pronounced acceptable by Harris interests, was presented to the Council on Oct. 12, but no definite action was taken. There are few changes from the draft as it stood after Corporation Counsel Miller's original alterations. A new motor bus clause bars the buses only from streets on which railway lines are operated. Buses are permitted to cross car line streets at right angles, to cross bridges with car lines and to have down-town terminals. Arbitration of labor troubles is to be by a board of three members of the State Railroad Commission or by three judges from outside Des Moines chosen by the Chief Justice of the Supreme Court.

The grant provides for the operation of one-man cars on certain lines and makes possible one-man cars on all lines at certain hours. The clause requiring city car supervisors to be graduate engineers has been eliminated.

An initial fare of 8 cents is provided, with no return on the common stock until the fare is reduced to 7 cents. The allowance provided is for a 3 per cent return to the company on a 7-cent fare, 4½ per cent on a 6-cent fare, 6 per cent on 5-cent fare.

The Council at its meeting on Oct. 12 ordered the Corporation Counsel to petition Judge Wade to order immediate resumption of service and by vote of four to one defeated resolutions offering a three-year bus franchise.

Sentiment is steadily crystalizing in favor of the return of the electric railway cars. Ten Connecticut buses left the city last week and the number of buses now operating in the city is under 100.

Wants Ten-Year Bus Franchise in Saginaw

A conference was held on Oct. 12 attended by George R. Bidwell, New York, president of the Trackless Transportation Corporation, members of the Council of Saginaw, Mich., and the Board of Commerce Committee relative to organizing bus lines in Saginaw. To show an 8 per cent return on the investment, in addition to a suitable sinking fund it would be necessary to charge an 8-cent fare. The plan is to sell half the $500,000 stock in Saginaw, Mr. Bidwell's company to subscribe the balance.

The cost of operating thirty-five buses figured on the car-mile basis of the Saginaw-Bay City Railway, now in hands of a receiver, would be 28½ cents a bus mile. Mr. Bidwell's company could not attempt to finance a local company in Saginaw unless it was assured an exclusive privilege.

Mr. Bidwell after making survey of Saginaw and studying the conditions under which the Saginaw-Bay City Railway was compelled to operate did not express surprise that the local company had gone into the hands of a receiver. In order to go ahead Mr. Bidwell would have to be assured of a 10-year franchise and the elimination of all competition.

Pacific Electric and Los Angeles Railways Announce Cut of Four Cents an Hour

Wages of trainmen on the Pacific Electric Railway Lines were reduced four cents an hour, effective Oct. 1, 1921. This cut is made up of 2½ cents an hour in rates of pay and 1½ cents additional through discontinuance of the $5 a month bonus paid trainmen for a clear record. Under the new wage schedule trainmen will receive one cent more an hour than the wage prior to Aug. 16, 1920, as the last increase was 5 cents an hour.

The present annual vacation and transportation arrangements will be maintained, whereas after one year's service annual vacation of 12 days each year with pay is allowable, as well as certain transportation privileges as covered by the company's circulars of Dec. 17, 1918, and June 20, 1919. The Pacific Electric Lines are among the last of large employers of labor in Los Angeles to make reductions in pay and the cut has been made reluctantly to correspond with previous readjustments of hours and pay in other departments.

In comparison with other California lines the wages on the Market Street Railway Lines in San Francisco were reduced 4 cents an hour in August; 6 cents on the Oakland Traction and Key Route Lines in July. The old and new rates of pay in cents per hour on the Pacific Electric Lines are as follows:

	Rate	
Street Car Service	Old	New
First year	50	46
Second year	51	48½
Third year	52	49½
Fourth year and thereafter	53	50½
Interurban Service		
First year	52½	48½
Second year	53½	51
Third year	54½	52
Fourth year and thereafter	55½	53
Single Track Line		
First year	55	51
Second year	56	53½
Third year	57	54½
Fourth year	58	55½
Freight and Work Train Service Flat Rate		
Motormen and conductors	62	60
Trainmen and switchmen	57	54
Trolleymen	52	49
Yard foremen	62	60

Announcement of a reduction of 4 cents an hour it is reported was received with little protest by the Los Angeles Railway trainmen, while the trainmen of the Pacific Electric Lines, it is said, took the news in the same spirit since rumors had been afloat for some time that the company's financial status, owing to motor bus cumpetition, might make a reduction in wages necessary at any time.

In connection with the Los Angeles Railway's new scale of wages the merit system and bonus, amounting to about 2 cents an hour, will continue in force.

Proposal Renewed to Handle Freight in New York Subways

Freight transportation in the New York subways during the early morning hours, to increase earnings and help keep the fare at 5 cents, has been proposed by the Transit Commission to the Port Authority controlling harbor transportation, of which Alfred E. Smith, Lewis H. Pounds and E. H. Outerbridge are the New York members.

The Transit Commission's engineers, it was announced, are working out a plan for handling freight trains in the subway between 1 and 5 a. m. to transfer freight between terminals in Manhattan, the Bronx and Brooklyn, thereby earning a large profit during a period in which the subway trains now do not pay for their operation.

It was announced by the Transit Commission representatives that this proposal does not aim at any interference with the Port Authority's plans for organizing freight handling for the whole harbor, but is to be directed toward supplementing the harbor freight system with highly effective freight distribution on this side of the Hudson. The new terminals to link the subway with the railway freight systems, they said, would quickly be paid for out of the profits of operation of freight trains in the subways.

Another Commissioner for City Participation in Utility Ownership

William A. Prendergast, chairman of the New York Public Service Commission, whose opinion in the Utica fare case attracted state-wide attention, emphasized the need for immediate city participation in utility affairs and ultimate municipal ownership in a speech which he made before the Empire State Gas & Electric Association at its meeting at Lake Placid on Oct. 7. In his address Mr. Prendergast said:

> The time has arrived for some constructive effort to correct present conditions. There is no use in permitting their continuance. If this is attempted, public disfavor will exhibit itself in demands for more drastic remedies. The principle of municipal operation has its main support in a desire for a change, rather than in any inherent belief in the efficacy of the principle itself.
>
> I am suggesting a working partnership between a unified gas corporation and the city. There are precedents for this. It is not a new experiment. The exact basis for this partnership I am not prepared to discuss definitely at this time, but will say that in the recommendations of the surpassingly able report of the Transit Commission issued on September 30 there is considerable suggestive matter that would apply to the gas company situation. On one point however, I wish to be absolutely specific at this time and say that the City of New York must have a positive voice and representation in the management of such an enterprise. Legislative sanction would be required and this, I feel assured, could be obtained.
>
> I am not suggesting municipal operation. On the contrary, I would deprecate it. For the city to have representation in an enterprise is one thing. For a city government to have the responsibility of conducting a great and intricate business is quite another. The political changes that take place in a city government absolutely preclude the possibility of successful municipal operation. Further, the city could not buy the companies outright, for it has not the credit for such a gigantic operation.

According to Mr. Prendergast the New York city public is "strongly critical, suspicious and unfriendly" toward practically all public utilities, and in suggesting the creation of the gas consolidation he emphasized that only "the genuine value of the present great investment in the gas business need be protected" in consideration of his ideas.

Municipal Tangle Discussed

Nothing Tangible Will Be Accomplished While Company and Council Fight

Unless the Minneapolis Street Railway can have the confidence and co-operation of the City Council in its efforts to provide better service for the people of the city nothing will be accomplished and car riders will be the sufferers. This opinion was recently expressed by Horace Lowry, president Minneapolis Street Railway, to the Council's special committee on street railway matters and road extensions.

Mr. Lowry in commenting on the activities of the company during the current year said that $528,700 had been spent in improvements though the revenue had decreased. He alluded to the city's opposition to the Railroad & Warehouse Commission in authorizing a 7-cent fare with four tickets for 25 cents and said that the city took the stand that the company would not be required to make further paving or extensions this year, yet a few days later a mandamus action was begun by the city to force the company to pave Johnson Street northeast.

In his plea for co-operation Mr. Lowry said in part:

> The company wants an opportunity to show the members of the City Council and the Mayor what it is trying to do. The company is on its toes and ready to provide the best of service that its revenues will permit. It is now providing the best service at lowest cost of any city in the United States, and I challenge anyone to dispute this fact.
>
> The company wants to establish good credit. It cannot get credit now. The company will have to pay 8 per cent to renew its mortgage bonds due January 1.
>
> To show what we are doing, and attempting to do, we invite the members of Council and the Mayor to visit our shops, take lunch, and after inspection there, make a tour of the system in one of our new double-unit cars. We want your confidence and co-operation in aiding us to get enough money to maintain good service, and establish proper credit.

The committee voted unanimously to accept Mr. Lowry's invitation.

Outlook Good for Reorganized Lines

The committees which have been soliciting subscriptions to the stock of the new Brunswick & Interurban Railway, Brunswick, Ga., report that much progress has been made and they are confident that they will secure sufficient funds for the operation of the line. The Brunswick & Interurban Railway is the successor company to the City & Suburban Railway. Reference was made to the reorganization of the property in the ELECTRIC RAILWAY JOURNAL, issue of Sept. 17.

Trolley Bus an Evolution, Not Revolution

Thomas S. Wheelwright, president of the Virginia Railway & Power Company, Richmond, Va., recently issued a statement designed to refute some erroneous thinking about the place of the trackless trolley or trolley bus and its relation to the present electric railway system. As a certain amount of this kind of talk is passing around in the industry as well as among laymen, the following extracts from the statement should be considered.

Mr. Wheelwright points out that since July 1 successful demonstrations of the trackless trolley have been made in Richmond and Norfolk, Va., in the smooth-paved residential districts, where the right to operate noisy track lines had been denied. During the demonstrations, the public as well as public officials of these two cities were most generous in their approval of this new method of transportation. In their references to the new trolley bus many of its enthusiasts have carelessly remarked that it is a revolution of the present street railway system, which is all wrong. It is an evolution, not a revolution, Mr. Wheelwright emphasizes. The trackless trolley is a means for the development of the present street railway system whereby transportation service can be made to grow and expand with the development of the community. The use of the term "revolution" in connection with the trolley bus has already fixed in the minds of some the idea that the present street railway system is to be discarded and the tracks torn up and trolley buses substituted for street cars.

Mr. Wheelwright points out that neither Richmond nor Norfolk nor any other city is much concerned about changing the mode of its transportation where it already exists. What should concern every growing community is how to keep the transportation lines it already has and how to get service into those sections not now served. The evolution of street paving from cobblestones to Belgian block, to asphalt and concrete, has suggested a type of transportation vehicle that will be in keeping with the quiet and comfort of the new smooth paving. This has brought the trolley bus, which is especially designed for operation in those smooth-paved sections where regular transportation service is not now available. Its function will be to reach out into the unserved sections.

Thus the trolley bus is an evolution or development, not a revolution or overthrow. It is a means by which the electric trolley can be made a greater factor in community growth of the future than it ever has been in the past.

Men Accept Cut. — Employees of the Springfield (Ohio) Railway have voted to accept a wage scale of 42, 44 and 46 cents an hour. The former pay was 53, 55 and 57 cents. The cut became effective Oct. 1.

Suggests Subway for Montreal

The plan and route for an underground railway in Montreal, Can., have been outlined by F. S. Williamson, prominent engineer, whose paper on subways read recently at the Town Planning Convention, has caused considerable comment.

In Mr. Williamson's opinion a subway system in Montreal would cost about $25,000,000. It should be operated by the Montreal Tramways. With such a system in force transportation carriers in Montreal could handle 300,000,000 passengers a year.

Wage Cut Accepted "Under Protest"

A 12 per cent wage reduction ordered by the Omaha & Council Bluffs Street Railway, Omaha, Neb., has been accepted by the union "under protest." The reduction was 7 cents an hour. The old scale was 53 cents an hour for first three months of service, 55 cents for next nine months, and 57 cents after the first year of service. The new scale is 46, 48 and 50 cents an hour, respectively, for the periods mentioned.

The men voted three to one against taking a strike referendum of the union. Anton Rubeck, president of local union No. 807, stated that the men adopted the right course when they voted against taking a strike vote and accepted the decrease of wages.

The action of the company in reducing the wages was in line with a recent recommendation of the Nebraska Street Railway Commission, which denied the company's application for an 8-cent rate, with a special ticket rate. The wage reduction has been extended to all branches of the company's service. J. A. Munro, vice-president, accepted a cut of 25 per cent in salary, and the chairman of the board of directors was similarly reduced.

The saving in wages under the reduction will amount to nearly $200,000 a year.

Trainmen—Take Heed

George J. Plummer, superintendent of transportation for the Dallas (Tex.) Railway, has contributed "Transportation Department Hints" in the last issue of "Partners," the semi-monthly organ published by the traction company. In part they are as follows:

> I want better service for myself and for the public. I am not unselfish in this, for better service will result in increased car riders, and increased car riders will mean increased car revenue. Bear in mind that an increase or decrease in revenues will affect your condition.
>
> Do your duty by everyone and when the day comes to a close you can spend the evening at home with the folks in content. Violate the rules, circulate grouch, and things won't be pleasant at home nor here. You may have your likes and dislikes; leave your dislikes at home, for there is nothing to be gained by bringing them on the job.
>
> Every patron on our lines stands on an equal in the service you are to give. That service is gauged only by the passenger's every need; if lame, aged, or child, it is service to assist them on and off the cars, to a seat, and to a safe place on the curb.
>
> Representing the company you will understand that cleanliness in person, appearance, language and mind is most essential.
>
> A motorman who starts and stops his car with a jerk has no friends among the passengers or conductors. He makes life miserable for himself and everyone else. He wastes power in starting with a jerk, and tears down equipment in stopping with a jerk. He causes accidents and pain. We have no room for him on the job.

Railway Would Swap Its Right-of-Way for Power Rights

The Niagara Gorge Railway, Niagara Falls, N. Y., has applied to the New York state waterpower commission for permission to utilize water in the lower Niagara Gorge for power development purposes. It offers to deed to the state its right-of-way along the lower Niagara gorge between Niagara Falls and Lewiston for a scenic motor highway in return for the power development privilege below the American falls.

Although several other corporations have made application for power rights in the lower gorge, the offer of the Niagara Gorge Railway to give up its right-of-way to the state for a great scenic motor highway has impressed the state commission and a hearing on the proposal will be held before the board in Albany at an early date. The offer of the company was made by its president on behalf of the board of directors.

The route of the Niagara Gorge Railway between Lewiston and Niagara Falls is at the base of the rocky cliffs and alongside the lower Niagara River. Through Gorge Route cars operate over the line in conjunction with the Park & River division of the International Railway, which operates along the cliff of the Canadian side of the river.

Company Unable to Finance Extension

"The Ohio Valley Electric Railway will pay anybody in Huntington 8 per cent on a $40,000 loan, give the best of security and build at once the Norway Avenue extension," was the challenge flung by George I. Neal, counsel for the company, during his argument at a hearing before the board of commissioners in support of the company's application for more time in which to fulfill an obligation of its franchise. W. R. Power, general manager of the railway, discussed unreservedly the company's financial affairs and the same readiness was manifest in statements by H. J. Crowley, general manager of the American Railways, Philadelphia, principal backer of the local company, of which he is also the vice-president.

The extension in question was to have been completed by Oct. 23 next under penalty of $20,000 forfeiture. The railway has petitioned the commission to extend the time for one year, although definitely planning to begin the work early next spring. The protestants are not insistent nor desirous of the commission exacting the forfeit, but they take the position that the company should get the money and finish the work before cold weather. The company says it is unable to finance the project at this time.

After listening to the arguments the commission reserved its decision.

Another "Five-Cent" Candidate

Henry H. Curran, Republican Coalition candidate for Mayor of New York City, made public on Oct. 10 his first statement on the traction situation since the plan of the Transit Commission was made public. He declares that the plan as indicated by its own words is of a preliminary nature, but that it holds out definite hope of several things for which the city has waited for many years. He urges, however, that the validity of the transit law be tested, and that it be amended next winter to "give back to our local government the power that it took away from us." Mr. Curran said:

> I am for the 5-cent fare, I believe in it. As long as I am Mayor I shall fight for it. I know it is enough and I know also what a hardship it would work on the whole city if the unit of fare should be increased even 1 cent beyond the nickel.

Mr. Curran's statement gives a definite promise that when he is Mayor he will endeavor to co-operate with all the forces and agencies working for the good of the city.

The attitude of Mr. Curran toward any traction relief plan will not be determined, he says, by any consideration of the source of the plan.

Right to Inspect Buffalo Books Denied

Herbert G. Tulley, president of the International Railway, Buffalo, N. Y., has refused the city permission to inspect its books as the first step in the attempt of Frank C. Perkins, municipal commissioner of public affairs, to start proceedings for the restoration of the 5-cent fare in Buffalo. George Watson, an accountant, and Director Macomber of the bureau of public utilities, were authorized by the City Council to inspect the books of the company. In his public statement denying the request to inspect the books, President Tulley quoted from the latest reports of the company filed with the Public Service Commission showing it is not operating its city lines at a profit.

Commissioner Perkins, the Socialist member of the board, explained:

> What we particularly want to find out is the amount that the company is saving through the cut in the wages of its employees; what its receipts have been in the last eighteen months and how much more it has been collecting than it would have collected if the fare had remained at 5 cents as provided in the franchise.

It also has been proposed by the City Council that proceedings be brought to have the railway sell weekly or monthly tickets.

Function of a Railway —To Educate

When you are in doubt ask the Dallas (Tex.) Railway. It can handle all your queries—how often are motors oiled, how many agents are employed to take care of the accident claims, etc.

The company established this "know-it-all" reputation on Sept. 19 when it had charge of the meeting of the Dallas Electric Club. The meeting was turned into an educational rally where 200 club members learned a thing or two.

Mayor Couzens Urges Action

Urges City to Proceed to Take Over the Day-to-Day Lines of the Detroit United

The taking over of the day-to-day lines of the Detroit (Mich.) United Railway according to the decision of the board of arbitration is favored by Mayor Couzens. On its part the Detroit United Railway has indicated its willingness to expedite the transaction leading to the city's acquiring the lines under arbitration. By taking over these lines the city will be enabled to add another cross-town line to its system in a very short time. This, the Clairmount-Owen line, with the Grand Belt which will be taken over, will make three cross-town lines in the municipal system.

Included in the matters to be arranged are the necessary release of the mortgages, by court action, on the Detroit United Railway tracks and the working out of an agreement for the interchange of running rights on the Detroit United Railway and municipal tracks or a system of transfers. It is understood that both the company and the city favor an interchange of running rights rather than a system of mutual transfers. The arrangements to be made involve the working out of details as to the amount to be paid by each party for the privilege of running over the other's tracks.

Further negotiations are under way relative to the extension of the municipal railroad lines into the village of Hamtramck, which is entirely surrounded by the city of Detroit. The clause in the ordinance providing for municipal ownership, which permits the city to build and operate lines up to 10 miles beyond the city limits, was inserted to provide for municipal lines into new territory as the city limits are extended. It is expected that eventually Hamtramack will become part of Detroit.

According to a report from Lansing the Supreme Court has affirmed the action of the Wayne County Circuit Court in refusing to grant the motion of the Detroit United Railway to dismiss the ouster proceedings started by the city in 1918. A Council resolution of July 30, 1918, provided for legal proceedings to obtain a judgment of ouster against the Detroit United Railway on all lines where franchises had expired. Shortly after this resolution was passed, the Kronk ordinance was passed fixing the rate of fare at 5 cents on all lines. The company took the matter of the Kronk ordinance into the Federal Court on the ground that it was confiscatory and that the Council was without authority to pass it.

The company sought to have the ouster case dismissed, claiming that the ouster proceedings should have been started by ordinance and not by resolution. It was further claimed that the Kronk ordinance amounted to a franchise renewing the company's rights in streets where franchises had expired. The Supreme Court decided that the Council was within its rights in acting by resolution instead of by ordinance, and according to the Fort Street case decision, no Council action was necessary to justify the Corporation Counsel in proceeding with the ouster. It further held that the city had a right to reasonable control of its streets.

Paving Dispute Serious

City Uses Strong-Arm Methods in Seizing Funds of London Street Railway

Following a brief resort to law the City Council of London, Ont., and the London Street Railway have arranged an armistice in their paving dispute. The company, operating under a franchise agreement made in 1895, is held to fares which according to its president are the lowest in America. Shareholders have received dividends averaging only 4 per cent and since 1917 their investment has earned nothing.

The Ontario Railway & Municipal Board, after operating the property for a year relinquished it to the company and advised the City Council that without an increase in fares the company cannot improve the service or comply with its admitted obligation to pave its right-of-way.

Two years ago the city paved Rectory Street and billed the company for $7,500 for its share. This amount remained unpaid. On June 10, 1921, the city obtained judgment for the full amount by default, the company admitting liability but pleading inability to pay. On Sept. 16, in exhibition week, a deputy sheriff seized all cash in the company's offices, amounting to $1,550 to satisfy the judgment, and thereby forced the company to pass its pay day. On the following Monday the sheriff repeated the raid, but could find no money.

Subsequently R. G. Ivey, the company's legal adviser, negotiated a truce with the City Council on the understanding that the company will attempt to pay off the balance of the debt in monthly installments of about $500 each. By another transaction the City Council decided, without prejudice to its legal rights, to accept President Currie's offer to regrade tracks, and to pave right-of-way on various streets with crushed stone and tarvia, though the city uses asphalt. On Stanley Street the city paved with asphalt and the company graded with gravel, employing men with brooms to sweep back loose stones, as the city threatened suit alleging that the company was responsible for mutilation of the new pavement. Under the settlement that section is also to be treated with tarvia.

The union of employees at a mass meeting decided not to press the company for payment on the regular pay day, under the circumstances, and President Currie has asked the Council for another conference on increased fares in the interests of better service.

News Notes

Freight Service Established. — The South Carolina Light, Power & Railway Company has started a freight service on its Glendale line. When the volume of business warrants it an extra number of cars will be pressed into service.

Railway Affairs to be Investigated.— A committee consisting of three city officials of San Diego, Cal., will be formed to look into the difficulties facing the San Diego Electric Railway and to offer suggestions for a solution of the transportation problem in that city. It was agreed that the committee should have the power to call in the assistance of outside statisticians and experts if that course were found necessary.

Hudson Valley Railway Wages Cut.— H. B. Weatherwax, vice-president of the Hudson Valley Railway, Glens Falls, N. Y., interviewed at Albany, N. Y., on Oct. 12 by the resident correspondent of the ELECTRIC RAILWAY JOURNAL, advised that the wages of the men were cut from 60 cents an hour on Oct. 1 to 55 cents an hour and that on Nov. 1 the wages are to be cut to 50 cents an hour.

Submits New Franchise.—The draft of a new franchise for the electric railway in Champaign, Ill., was recently submitted to the city officials by officers of the Urbana & Champaign Railway, Gas & Electric Company. The provisions were not made public, but it was reported that certain changes would have to be made before the city authorities would accept the proposed franchise. The official answer of the city is expected to be given out in a short time.

Extends Lines By Buses.—The City Council of Minneapolis, Minn., has ordered the Minneapolis Street Railway to extend its Second Street Northwest line several blocks to the Northern Pacific Railroad shops. This will be provided in about a month with buses. This will be subject to permanent determination by the Council. The company will give service on certain extensions next spring with trackless trolleys if the city will pave the streets, it is planned.

May Electrify Line.—Miami, Okla., will be the terminal for a new electrified line which will be an extension of the Miami Mineral Belt Railway. This announcement was recently made by H. M. Levy, superintendent of the above mentioned property. The line will run through the business section of Commerce, entering Miami from the northeast. Through service will be established between Miami and Baxter Springs, Kans. A preliminary survey is being made.

Financial and Corporate

Municipal Railway Financing Again Causes Concern

To provide funds for the purchase of twenty-five new cars for the Seattle (Wash.) Municipal Railway, to pay the city's present indebtedness to the Western Washington Power Company for the Greenwood car line in Ballard, and to provide funds for the retracking of First Avenue and First Avenue South, an ordinance was recently introduced in the City Council authorizing the sale of bonds in the sum of $680,000.

The bill is a new draft of an old proposal which has been contemplated for a long time, but before being voted on it will be sent to the city's bond attorneys in New York City for approval, although they have already stated they would acccept such procedure.

The Council will also undoubtedly await the report from D. W. Henderson, general superintendent of the railway, as to the possibilities of the trackless trolley, which he recently went East to investigate. The trackless trolley has been proposed as a measure to obviate the necessity of purchasing new rails for First Avenue.

The City Council finance committee has suggested through Chairman C. B. Fitzgerald a plan to change the character of the $15,000,000 of bonds issued to the Stone & Webster interests in payment for the street railway system. The plan involves the cancellation of the present bonds and issuance of new securities, probably maturing in forty years.

The plan is offered as one of the ways by which fares may be reduced. It would greatly diminish annual payment on bonds, and together with added revenue resulting from the elimination of jitney competition, might aid in decreasing the present 8½-cent fare. The city is now under obligation to redeem in seventeen years the bonds issued in payment for the railway system. The annual payment under this plan is $833,000, the first installment of which falls due on March 1, 1922.

Detroit United Financing Reported

It was stated at Montreal, Que., on Oct. 7 that the Detroit (Mich.) United Railway has practically completed disposal of $4,000,000 of twenty-year notes to its own bankers and other interests. The issue replaces various short term issues shown in the last balance sheet as notes payable. It is also stated that the May 1 maturity of $855,000 of subsidiary bonds and Aug. 1 of $1,400,000, or $2,255,000 in all, have been extended to Jan. 1, 1932, when the consolidated mortgage bonds expire. This financing together with conservation of cash through payment of scrip dividends, places the company in a more favorable position, the sale of 29 miles of trackage and other equipment to the municipal road also making for a generally easier financial position. It is stated that cash dividends will be resumed in the near future.

Surprise Element Introduced

$2,433,067 Over Physical Value asked by Toronto Railway in Arbitration —Hearing Continued

W. J. Hagenah, expert witness for the Toronto (Ont.) Railway, occupied the stand during the week ended Oct. 1 in the arbitration proceedings to determine the value of the Toronto Railway system.

Evidence similar to that reported in the ELECTRIC RAILWAY JOURNAL previously was given in detail with respect to track and roadbed, overhead structures, and rolling stock. The summary of appraisal based on labor and material prices as of Sept. 1, 1921, showed a reproduction cost of $26,110,044 and present value of $20,032,837, made up of the following principal items:

	Reproduction Cost	Present Value
Way and Structure..	$9,649,321	$7,759,834
Equipment	9 609,915	6,969,781
Power	3,259,951	2,157,249
General	1,819,857	1,374,973

In each case an additional value of the actual and tangible property was made of $1,751,000.

The power plant on Front and Frederick Streets was given a reproduction cost of $459,630 and present value of $252,474. The structural efficiency of the building was estimated at 88 per cent. Substation equipment reproduction cost $1,678,305 and present value $1,265,488.

The steam plant on Front Street is not proposed to be taken over by the city, which intends to use hydro-electric power from Niagara.

An element of surprise was introduced into the arbitration when counsel for the Toronto Railway presented a claim aggregating $2,433,067 over and above all the physical assets of the company. The total was arrived at by the addition of various items which the company claimed would have to be incurred if the present road had to be newly constructed. These items would include injuries to workmen during construction, salaries of executives and officials during period of construction, interest on capital during construction and legal cost.

The arbitrators decided, Sir Adam Beck, arbitrator for the city dissenting, to allow counsel for the company to present valuation estimates on a basis of the three-year period ending Sept. 1, 1921. The decision, however, is not final as to acceptance of such evidence as a basis of determining the value of the property.

Progress Slow in Providence

Business Depression and Jitneys Keep Down Earnings of Successor to Rhode Island Company

It is reported unofficially that the receipts of the United Electric Railways, Providence, R. I., the successor of the Rhode Island Company, during the first three months of operation were sufficient to pay operating expenses, taxes and fixed charges, but not sufficient to pay a 6 per cent dividend on the stock, to which it is entitled under the law. The earnings have been affected by the business depression, the competition of the jitneys and the motor buses. Receipts for the quarter recently ended were 15 per cent below those of the corresponding quarter of last year.

It is estimated that motor competitors are depriving the road of $1,000,000 income a year, and this in spite of the ordinance passed by the Providence City Council early this year. This ordinance provided that jitneys and buses must run on specified routes during regular hours and subject to police inspection and control. It gave the City Council authority to bar motor vehicles from any street upon presentation of sufficient evidence that the public was being adequately served by other conveyances on that street.

Since this law has been in effect, there has been no decrease in the number of jitneys and buses operating in Providence. Last March, when the ordinance became operative, there were 281 licensed motor vehicles in the city. To day there are 286. The opinion prevails, however, that if the law had not been in effect there would be 1,500 jitneys and buses in Providence today instead of 300. The present regulations are too stiff for the fly-by-night operator to meet.

The permissive part of the ordinance has never been availed of to keep motor carriers from certain routes. There is at present no indication that the City Council will be in any hurry to act under it.

Gold Bonds of Georgia Property Offered

Stone & Webster are offering $1,750,000 of Savannah Electric & Power Company's, Savannah, Ga., first and refunding mortgage 7½ per cent gold bonds. The bonds known as Series A are dated Oct. 1, 1921, and are due Oct. 1, 1941. The price is 97½ and interest to yield about 7¾ per cent. Coupon bonds are in denominations of $1,000, $500 and $100.

The Savannah Electric & Power Company will purchase under the plan of reorganization all properties and franchises owned by the Savannah Electric Company and its subsidiaries, comprising a large part of the electric light and power business and the entire electric railway business in the city of Savannah. This issue of $1,750,000 bonds has received the necessary approval of the Railroad Commission of Georgia.

Master's Report Condemns Management Contract

Management Contract, in Case of Columbus Railway, Power & Light Company, Declared to Be Against Public Policy and Illegal—Fees Held to Be Excessive—Profits from Engineering Service and from Sale of Securities Judged Reasonable and Legitimate

Declaring that "the executive operation and management of the street railway company by the banking house at Philadelphia was a plain usurpation of the powers and business of those corporations, in violation of the meaning, spirit and intent of Sec. 8660 of the General Code," Master Commissioner George B. Okey, of Columbus, Ohio, holds the management contract between E. W. Clark Management Corporation and the Columbus Railway, Power & Light Company to be illegal and against public policy. This case is one which, when finally acted upon by the higher courts, to which it is almost certain to be appealed, is apt to have a very important effect upon similar management contracts with public utilities all over the United States. The present report, being only the finding of a Master Commissioner, is, of course, not conclusive, but is important.

THE case in question is one which originated from a suit by one Augusta M. Slaymaker, a stockholder in the company, against the Columbus Railway, Power & Light Company, and others, including E. W. Clark & Company Management Corporation and various individuals who have been or are directors of the first named company. The original case soon lost its significance, however, in a cross petition filed by the Columbus Railway, Power & Light Company, against the E. W. Clark & Company Management Corporation and C. M. Clark, requesting an account and suing for restoration of certain funds totaling more than $2,600,000.

The points at issue were fees charged under the management contract; fees and profits from financing operations for the company; loss claimed through the exchange of capital stock at times of reorganization; engineering and construction fees charged and collected by the Management Corporation; unvouchered expenditures of the company's treasurer; mismanagement as evidenced by voluntary surrender of franchises.

The master reviews the allegations of the Columbus Railway, Power & Light Company at length, and gives his conclusions of facts with reference to the points enumerated above, the sums involved as deduced from testimony all being listed. It is important to note that the master's final conclusion of facts is that in all of the negotiations the board of directors acted in perfect good faith and with ordinary care and prudence.

Coming to conclusions of law, the only transaction involving any question of illegality or excessive fee is held by the master to be the management contract. In all of the other transactions the E. W. Clark Management Corporation and E. W. Clark & Company are upheld. Under this management contract the E. W. Clark Management Corporation received from 1912 to 1919 1½ per cent of the gross income of the company for its services. Previous to 1912, the master points out, C. M. Clark was a vice-president and director of the street railway company, and was a partner in the banking house of E. W. Clark & Company, which for years had handled the securities of the Columbus property. The master says:

> The association was beneficial to the railway company and profitable to the banking house. The banking house received the annual salary of $5,000, paid to C. M. Clark for his services as vice-president of the company; it received $3,000 annually for its services in auditing its books and paying dividend and interest coupons; it received fair and reasonable banker's profits from handling its notes and securities; it was enabled to realize excellent profits from the services rendered to the company by its engineering organization which it maintained on the ground.

But the management contract, the master goes on to say, "was a radical step. By its terms E. W. Clark & Company were 'to assume the management of the company.' It was carried out in practice and interpretation to mean both executive operation and financial management."

The master then points out that E. W. Clark & Company, from April, 1912, to January, 1913, received $345,166 for the management service and $165,187 as construction fees for services rendered by the engineering department; in the same years they realized a profit of $109,033 in handling notes and securities of the company.

In view of the "receipt of these large sums of money" the master commissioner gives his opinion that the management contracts "were unconscionable," and upon that ground should be regarded and treated as nullities, aside from the questions of corporate power upon the part of a company to enter into them and of invalidity by reason of the fiduciary relations above referred to. (The master had previously gone into great detail to point out the fiduciary relations of C. M. Clark as an officer of both company and banking house.)

The commissioner says that he cannot see that the services of C. M. Clark were of any greater value subsequent to 1912 than they were before that time, and the same thing may be said of the auditing or banking services of the banking house. Aside from these charges, and the salary of the president of the railway company, the master claims there was no consideration whatever passing from E. W. Clark & Company to the street railway company, and in his conclusion states that a decree should be entered for a judgment against E. W. Clark & Company for $345,166, subject to a credit of the annual sum of $8,000, together with certain sums that were paid to the president of the company during that time. This virtually would annul the value of the management contract as such, substituting therefor the mere salaries of certain representatives of the Clark company holding official positions in the railway company.

The discussion and condemnation of the management contract is in such general language as to be applicable to most such contracts in the country. The master said:

> As an abstract proposition, standing alone, there is nothing sinister in a fiduciary relation. On the contrary, no position in life is more commendable. A large part of the business of the world is transacted by those holding positions of mutual trust relationship. The mere fact of the existence of such relationship does not vitiate a transaction. Courts of equity do not interfere with agreements and transactions upon that naked ground. The books disclose hundreds of cases in which transactions were upheld, notwithstanding the existence of a fiduciary relationship, where full consideration was paid, where no advantage was taken, where full disclosures were made, and where no elements of fraud or wrong were found.
>
> All such transactions, however, are subjected by courts of equity to the most painstaking scrutiny, to ascertain whether any element of unfairness or wrongdoing may be found to exist. If such proves to be the case the equity powers are ruthlessly enforced. They do not step short of full and complete restoration of the *status quo*. If real estate had been received by the fiduciary, the conveyance is set aside; if money had been received by him, a decree for its recovery results.
>
> The fiduciary relationship becomes a deciding factor in the "management contracts" in question, because of their wrongful character. Before and during the entire period of their existence, the defendant, C M. Clark, was a member of the board of directors and vice-president of the street railway companies, and also a member of the banking firm of E. W. Clark & Company, with which the contracts were made. By reason of his remarkable personality and character he exercised a dominating influence in the affairs of the board.
>
> As practically interpreted and carried out the "management contracts" operated as delegations of corporate powers by the boards of directors, with respect to the business and property of the corporation, which under the provisions of Sec. 8660, were impossible of delegation. It is no answer to this view to say that a corporation cannot, as a corporate entity, carry on its business, and that it must employ officers and agents for that purpose. The case here is wholly unlike the appointment, by a board of directors, of an officer, such as a president or superintendent, and the prescribing of his powers and duties. There is no analogy between such an appointment and the delivery by a corporation, of its entire executive and business management, to a foreign banking house. The directors are not the corporation, but only its agents. Such agents cannot delegate authority requiring the exercise of discretion or judgment.
>
> The contracts were opposed to public policy, as well as in express violation of the statute. They were without consideration and are vitiated because of the fiduciary relation of the defendant, C. M. Clark, to the parties to them. They are not binding upon the *cestuis que trustent*, the stockholders. The interest of C. M. Clark as a director of the street railway and as such representing the stockholders, was opposed to the interest of C. M. Clark as a partner in the banking firm of E. W. Clark & Company.

As stated above, with reference to all other points, the master finds no error in action or excess in amount. Profits on bonds of $180,000; for the resale of those bonds, of $97,419; on resale of notes, of $20.422, or for redemption of underlying bonds, $200,583, are called just, fair and not excessive profits to the company. Engineering fees of $165,087 are called not excessive, and E. W. Clark & Company are said to have carried out this contract honestly, efficiently and faithfully.

At another point it is interesting to note that the master holds that it is not necessary for an accounting to be given by a treasurer who is given discretionary power in the expenditure of reasonable sums of money. The master goes on to say regarding this:

> A public service corporation has a right to expend reasonable sums of money to protect itself against threatened attacks, sinister in character, and calculated to affect injuriously the proper and successful operation of its business. It may expend such a sum in published propaganda, educational in character, with the end in view of planting in the public mind a just and fair comprehension of the relation which should exist and prevail between the citizen and such a company. We live in a practical and not a theoretical world. It is important and necessary for our service corporations to make expenditures every day, not at all improper in themselves, which it would not be wise to shout from the housetops.
>
> The mere fact that the books and accounts of such a company are kept in such a manner as not to disclose the minute purpose of each expenditure furnishes no presumption of illegality or impropriety.

The entire case will probably come up for review before Judge Kincaid before the end of the current month. No matter what his decisions are with reference to the master's findings, it seems evident that the case will be appealed by one side or the other, if not by both, until a decision on the various facts involved is obtained from some court of final resort.

Purchase Review Case Argued

The appeal of the Puget Sound Power & Light Company, Seattle, Wash., against a decision of the District Court, denying an injunction against S. B. Asis and thirteen other taxpayers, asking for a review of the purchase of the lines now included in the Seattle Municipal Railway System, was argued recently in the United States Circuit Court of Appeals in Seattle. The matter was taken under advisement by the appellate judges. Arguments were confined to legal points of the matter.

Financial News Notes

New Hearing Date Arranged.—Judge Julius M. Mayer in the Federal District Court on Sept. 30 postponed the hearing on the application for a receivership for the Interborough Rapid Transit Company, New York, N. Y., until Oct. 27. This is the fourth adjournment in the matter.

$182,525 Loss in Boston in August.—Operation during the month of August, 1921, resulted in a further temporary set-back for the Boston (Mass.) Elevated Railway. Revenue failed to meet expenses by $182,525. As a matter of fact, the total business was $151,064 less than during August last year. The outstanding deficit, therefore, on Sept. 1 was $193,026.

Railway Sells Land.—The application of the Public Service Railway, Trenton, N. J., for the sale of a parcel of land in Paterson to James J. Murner, was sanctioned by the Public Utilities Commission recently. It was declared that the land was not necessary for the immediate or future corporate use of the firm.

Interurban Fares Permitted to Stand. — The Detroit (Mich.) United Railway will be permitted to continue to collect on its interurban lines the fare charged under the act of the Legislature in 1919. The United States Supreme Court on Oct. 10 declined to review the case and the decision of the Supreme Court of Michigan permitting increases will stand.

Old Niagara Interurban to Be Abandoned.—The International Railway, Buffalo, N. Y., has informed the municipal authorities of North Tonawanda that it has decided to abandon its old Niagara Falls interurban line between North Tonawanda and the Niagara Falls city line. All traffic will be diverted by the railway company to its new high-speed Buffalo-Niagara Falls line.

Interest Paid on General Mortgage Bonds.—H. A. Ferrandou, treasurer for the receiver of the New Orleans Railway & Light Company, New Orleans, La., announced recently that the July 1 coupons of the 4½ per cent general mortgage bonds of the company would be paid on and after Sept. 30, upon presentation at the office of the New York Trust Company.

Exchange of Securities Nearly Completed.—Of the approximately $24,000,000 of United Railroads of San Francisco 4 per cent certificates issued by the depositaries against the general first mortgage 4s of 1927, all but about $2,000,000 issued by the Equitable Trust Company and Guaranty Trust Company, New York, have been exchanged for securities of the Market Street Railway under the plan of reorganization.

Sale Under Foreclosure Ordered.—G. Ray Craig, special master commissioner, has announced the date of sale of the property of the Plymouth & Shelby Traction Company. The sale will be held on Oct. 29, in Plymouth. The court has ordered the master commissioner to have the bidders post $5,000 before being allowed to submit a bid, and no bid for less than $20,000 will be accepted. C. G. Taylor is receiver of the company.

Foreclosure Expected to Be Averted.—Representatives of interests affected by filing of suits appeared in United States District Court and asked for order of foreclosure on the St. Louis & Suburban Railway, St. Louis, Mo., because of default on $2.000,000 first mortgage bonds. The withdrawal of lines from the United Railways system will be averted, it is believed, as holders of underlying securities may advance funds to protect their interests. No date has been set for a hearing.

Line to be Discontinued.—The Georgia Railway & Power Company, Atlanta, Ga., will discontinue service on its line from Oglethorpe University to Camp Gordon. The State Railroad Commission ruled recently that it had no authority under the conditions under which the Camp Gordon was built to prevent this discontinuance. There were no franchise obligations, the extension having been made and restricted to the period of the maintenance and continuance of Camp Gordon as a training camp for federal troops.

Railway Holding Its Own.—In the opinion of W. H. Sawyer, receiver of the Alton, Granite & St. Louis Traction Company, Alton, Ill., the railway is keeping up very well despite the period of depression. In the month of August the company made $300 in Alton though of late there had been no profit at all on the Alton lines. The installation of one-man cars, the receiver believes, is the reason for this gain in revenue. However, the interurban business has fallen off considerably, due, in the receiver's opinion, not to higher fares but to the increasing number of automobiles.

Interborough Prepares to Pay Manhattan Dividend.—The New York Stock Exchange has received notice from the Manhattan Railway of the declaration of the regular quarterly guaranteed dividend of 1¾ per cent distributable to holders of record of Oct. 7. The payable date has not been fixed as yet. The committee on securities of the Stock Exchange has ruled that the stock shall not sell ex-dividend on Oct. 7, and that all deliveries after that date must be accompanied by a due bill for the dividend. The dividend is guaranteed by the Interborough Rapid Transit Company under the lease of the Manhattan (Elevated) Railway to that company.

Montreal Tramways Contemplates Financing.—E. A. Robert, president of the Montreal (Que.) Tramways, at the close of the meeting of the directors on Sept. 14 stated that he had no definite information to give out regarding the proposed new financing. He admitted, however, that negotiations were in progress with leading American and Canadian financial houses, and that now it was largely a matter of waiting for a more favorable money situation in order to secure the necessary capital at a rate more commensurate with pre-war terms. It is stated unofficially that from $6,000,000 to $8,000,000 will be required to meet obligations during the next year or two, in order to permit the management to carry out a program of betterments and extensions affecting the entire system. This amount will be required to buy in maturing bonds in 1922 to the extent of about $3,250,000, while at least $2,000,000 will be required for capital expenditure already made, and at least another $1,000,000 or thereabouts will have to be provided for 1922 under the same heading.

Traffic and Transportation

Results of Decreased Fare Not Satisfactory

Just what has been the result of the decreased fare, or 7-cent charge which went into effect on Sept. 1 on the lines of the Washington Railway & Electric Company, Washington, D. C., is seen in an estimate made public recently by W. F. Ham, president of the company.

For the first three weeks in September of this year there has been a loss in passenger traffic of 214,950 passengers with a 10 per cent cut in revenue as compared with operation for the same period a year ago. Mr. Ham states that if this reduction in travel continues for the eight months for which this order is effective at the same rate of reduction as in the first three weeks the company will suffer a loss in revenue of approximately $650,000 a year. A similar loss has been suffered by the Capital Traction Company, the other operating company in Washington. This property carried 3,975,365 passengers for the first three weeks of operation under the 7-cent fare against 4,073,475 hauled in the similar period in 1920. The revenue collected amounted to $285,015 against $309,003 for the same period of last year.

Cities Win on Five-Cent Fare Issue

The existing contracts between the cities of Decatur and College Park with the Georgia Railway & Power Company have been held valid, thereby sustaining the 5-cent fare between these municipalities and Atlanta. This opinion was recently handed down in the Supreme Court of Georgia as a result of the railway's efforts to extend the 7-cent fare.

Passengers who have been paying the extra 2 cents can now be reimbursed by the railway if they hold receipts. The ruling means that between Decatur and Atlanta and between College Park and Atlanta no more than 5 cents per passenger can be charged as provided in the original contracts.

President Shannahan Protests Against Jitneys

John N. Shannahan, president of the Newport News & Hampton Railway, Gas & Electric Company, Newport News, Va., is up in arms against the jitney. He insists that the auto pirate shall be put on a footing with the electric railway as regards its obligations to the public and has asked the Council to take steps to this end. According to Mr. Shannahan his company is losing about $150 a day in revenue to the jitneys.

As a result of Mr. Shannahan's protest City Manager Thom has been requested by the Council to make a complete investigation of the entire situation and to recommend at the next meeting of the Council, if possible, what action the Council should take to remedy the situation.

The patrons of the jitney are recruited largely from those who are rankled at the continuation of the charge of 7 cents for fare by the railway in the face of lowered costs for a great many commodities and of lowered wages generally among the manufacturing classes.

Bus Petition Allowed

Receiver of Interurban Scored by State Commission for His Unprogressive Attitude

The Illinois Commerce Commission has granted the Smith Bus Line Company the right to operate motor cars on regular schedule between Aurora and Big Rock. The Aurora, Elgin & Chicago Electric Railroad, through its receiver, Joseph Choate, opposed the authorization of the bus line. The Commerce Commission held, however, that the railway was not giving adequate service and that the bus line, especially between St. Charles and South Elgin, would not compete with the railway.

The bus line between these points is required to operate its cars on the west side of the river, whereas the railway is on the east side to a point close to South Elgin. The bus line expects to put cars in operation at least by Oct. 15. Before it can give authorized service it must furnish a $10,000 bond on each automobile to protect its patrons in the event of accidents.

The commission says that although the railroad receiver had been requested to extend its line from the corner of Wilson Street and Batavia Avenue, east on Wilson Street, across Fox River, approximately one-half mile, the company refused to extend the line and serve the public on the east side of Batavia. A substantial part of the business district of Batavia is situated in that district where there is a population of approximately 4,000 people.

In commenting on this attitude of unwillingness of the railroad to meet the public demand for service the commission said:

> When a public utility is serving a district under conditions which amount to a monopoly and declines or omits to extend its service to additional territory where it appears, as it does here, that it will greatly convenience the public and that a necessity exists for such service, such public utility should not be heard to complain that if another is permitted to enter the field and furnish substantially the same or better service, its revenue will be materially reduced because of the competition that will be created between the two public utilities.
>
> Modern methods employed in furnishing service to the public generally should and will be encouraged when it appears that substantial justice requires it and that the public will be permanently benefited.
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> An examination of the evidence indicates clearly that the service of the Aurora, Elgin & Chicago Railroad is inadequate.

City Extends Its Bus Operations

After receiving temporary permission from the city utilities committee to operate buses to the Cowen Park district of Seattle, Wash., jitney drivers were two days later again driven from the streets, after a stormy session of the City Council at which five councilmen of the eight voted permanently to oust the jitneys from all Seattle streets, except, where they serve as feeder lines. The drivers were forbidden to load or unload passengers within areas served by city street cars, except at their downtown terminus, but this did not prevent the city from rescinding its order.

Residents of the districts protested against the withdrawal of jitney service with the result that Councilman Carroll has proposed the installation of bus service such as is now used in Carleton Park and Laurelhurst, where the residents have purchased and donated to the city the buses in use on these lines. A fare of 10 cents is charged on these buses, with transfer privileges to and from the Municipal Street Railway with which they connect. This plan has also been arranged for another section of the city, South Beacon Hill, not now served by city cars, where the residents have purchased a truck and the city is constructing a body for the vehicle, so that it may be used for passenger service.

Three-Cent Fare Plan Opposed by Property Owners

The proposed plan of Oliver T. Erickson of the City Council of Seattle, Wash., to meet all operating and maintenance costs of the Seattle Municipal Railway by taxation, charging only extensions and betterments against operating revenues, has met with strong opposition by property owners. The Seattle *Times* states that analysis of the plan shows that property owners in the city will be paying into the city treasury $11,659,078 in taxes instead of $6,647,303 levied for next year. The Erickson plan is known as the 3-cent fare plan. It is proposed in an initiative ordinance now being checked by city registration clerks to ascertain whether it contains sufficient names of qualified voters to compel its submission on the ballot at the next municipal election in May.

According to statements made by State officials, the above estimate of increased taxes would be further enlarged by an item of approximately $900,000 for interest on outstanding warrants and bonds, as the classification of accounts for the Municipal Railway, prescribed by the Bureau of Inspection and Supervision of Public Offices of Washington, effective on Jan. 1, 1921, requires that interest on outstanding warrants and bonds be made an operation and maintenance charge. The interest paid by the railway on outstanding bonds and warrants during the first six months of this year totaled $434,312. In a year, this sum would be approximately $850,000 or $900,000.

City's Case Closed

Chicago Ends Argument By Which It Hopes to Secure Return of Five-Cent Fare

Hearings were begun on Oct. 4 before the Illinois Commerce Commission on the city's petition to restore the 5-cent fare on the Chicago Surface Lines. With the evident intention of getting a prompt ruling the city closed its case after four days and an adjournment was taken until Oct. 11 when the company began putting in evidence to show why the 8-cent fare should be continued in effect.

The main contention of the city is that the valuation of the properties fixed by the previous commission is too high by $80,000,000 and that by proper economies the companies could exist on a 5-cent fare. It was shown that the city's share of earnings from the surface lines would amount to $29,573,144 by next February. These payments have been made annually since 1907 under the ordinance provision by which 55 per cent of the net receipts of the railway goes to the city.

It was contended that the following items should be deducted from the capital account of the companies: Franchises, $9,016,971; organization and other intangibles, $8,000,000; property superseded in rehabilitation, $14,794,666; 15 per cent for engineering and brokerage, $12,739,080; patents, $56,193; horses, $34,100; bridges, $996,733; cars renewed in 1915, $1,026,033; interest and discounts, $2,379,294; total, $50,105,215. It was also claimed that the companies gave a lower valuation of the properties for taxation purposes.

MOVING PICTURES SHOWN AT HEARING

A feature of the hearing was the exhibition of moving pictures showing crowded cars. The city claimed that the conditions portrayed were typical of service conditions. President Henry A. Blair was called as a witness by the city to testify about certain expenditures during the 1918 campaign for a new franchise.

George W. Jackson, special traction engineer for the city, was also called. He proposed various economies which he said would enable the companies to operate at a profit on a 5-cent fare. He said that by re-routing and other changes there could be handled a 50 per cent increase in revenue passengers, but he did not show where these would come from or how they could be taken care of on present equipment. His plan for re-routing would mean the abandonment of about half of the downtown trackage and simplification of loops. He would use loading platforms 300 ft. in length and would abandon the use of river tunnels which are now the principal inlets and outlets from the loop district.

Mayor William Hale Thompson was also used as a city witness and gave it as his opinion that a 5-cent fare would be practicable on the surface lines even without wage reduction. He insisted that some other large cities are giving good service on a 5-cent fare.

One of the newspapers published a statement showing how the 8-cent fare of the surface lines was distributed for the month of July, 1921, as follows:

	Per Cent	Cents
Wages	54.12	4.299
Materials, power and other expenses	17.26	1.371
Taxes	3.50	.278
Damages	4.13	.328
Companies' 5% return	13.78	1.095
City's 55% of net	3.97	.315
Companies' 45% of net	3.24	.258
Total	100.00	7.944

This raised the question as to how the road could be operated without reduction of wages on a 5-cent fare.

Eight-Cent Jersey Fare

United States Court Restrains Utility Board from Enforcing Its Seven-Cent Fare Order

The plea of the Public Service Railway, Newark, N. J., to the courts for an increase in fare over that allowed recently by the Board of Public Utility Commissioners was passed upon on Oct. 12. Pending determination of the company's litigation for a 10-cent fare, Federal Judges Woolley and Rellstab have granted the company permission to increase its rate from 7 to 8 cents, with an additional charge of 1 cent for a transfer. The order also grants a temporary injunction restraining the State Board of Public Utility Commissioners from enforcing its decision of last July, fixing the fare at 7 cents, with 2 cents extra for a transfer. Judge Davis filed a dissenting opinion.

The opinion by Judges Woolley and Rellstab holds that the Utility Board underestimated or excluded from its valuations approximately $20,000,000 of the company's properties, and as the rates fixed by the board provide no return on these excluded properties, they are confiscatory. The only question, the majority opinion says, is whether the rate fixed by the State body is confiscatory "because based on a valuation of the property less than its worth at the present time." The Judges hold that the rate is confiscatory and therefore in violation of the Federal Constitution.

The rate fixed by the Utility Board, Judge Davis points out, gives the company a return of $5,842,500, which, after paying all operating costs, is nearly 5¾ per cent on the increased valuation fixed by the court itself. Judge Davis said:

> Assuming that the board did underestimate or wholly exclude the properties to the extent of $20,000,000 in view of the rate of return that the board's order permits, I should hesitate to say on a preliminary application, without the benefit of a full hearing, with many questions in doubt, that it was confiscatory. The Interstate Commerce Commission, composed of men of ability and experience and having at their command an advisory board of noted experts, allows the railroads a return of only 5½ per cent. If the court in this case is right, the Interstate Commerce Commission has confiscated the property of every railroad in the country—a most unlikely assumption.

To grant the increase to 8 cents, Judge Davis figures the court has added $20,000,000 to the value of the property of the Public Service Corporation, although the Public Utility Board had already allowed $12,000,000 appreciation to go into the final valuation.

The court's order will give the company additional earnings of approximately $1,400,000 a year, which is 7 per cent on $20,000,000 of property. Adding this latter sum to the valuation of $82,000,000 already allowed by the Utility Board, the court's action brings the valuation to $102,000,000.

The Utility Board placed the cost of the physical property at $70,000,000 and the figures are accepted by the court. The Utility Board, Judge Davis holds, "might have authoritatively said that it would be unfair to the public to base rates on an appreciated value to abnormal war prices, but it did not, and in its efforts to be fair allowed $12,000,000 appreciation to go into the final valuation for the purpose of fixing a rate of return."

The injunction is not permanent, but only allows relief pending the granting of a permanent restraining order. Under the 8-cent fare allowed by the court, four tickets are to be sold for 30 cents. Refund slips are to be issued for the extra cent over the fare of 7 cents fixed by the commission.

Jitney Injunction at Albany Gets Setback

Due to the fact that the attorneys for the United Traction Company at Albany, N. Y., failed to comply with the rules of court procedure, the injunction restraining jitneys from competing with the United Traction Company in Albany and vicinity has been made non-operative pending an order to show cause granted by Justice Gilbert D. B. Hasbrouck.

The rules of the court and of practice require that when an injunction order is granted in court a copy shall be filed in the office of the county clerk of a county in the judicial district, and whenever service is made of a copy of the injunction upon a party affected, that a certificate of the county clerk shall be attached thereto showing the filing of the original injunction in his office and that the original signature shall be exhibited to the person upon whom the order is served.

This for some strange reason the attorneys for the traction company failed to do, the service consisting simply of a printed copy of the injunction restraining order.

As the situation now stands, the justice before whom the appeal is taken, will undoubtedly rule that no injunction exists against the persons served and that service will have to be made again to conform with court rules.

The practical effect is to restore the jitneys, which had been practically driven off the streets, until the court and the attorneys can untangle themselves. It really means renewed jitney service for another month at least.

Public Utility Body Denies Ten-Cent Fare

New Jersey Commission Rejects Company's Estimates and Denies Plea of Suburban Line

The New Jersey & Pennsylvania Traction Company was recently denied a 10-cent fare by the Board of Public Utility Commissioners. This company is known as the "Johnson Line." It was founded by the late Tom L. Johnson. It operates its cars between Trenton, Lawrenceville and Princeton, N. J., and a number of points adjacent to the Delaware river opposite and north of Trenton in Pennsylvania.

Some months ago the Public Service Commission of Pennsylvania granted the company a 10-cent fare on each of its zones, while the New Jersey board in June of this year issued an order on an application of the concern for increased rates, in which an 8-cent fare on each of four zones between Trenton and Princeton was allowed, with four tickets for thirty cents.

At a rehearing of the fare matter before the Utilities Commission it was contended by counsel for the company that there had been errors in the report of the board previously made. It was pointed out that in making an estimate of the number of passengers to be carried on the lines of the company for the ensuing year, the board erred in basing its calculations upon the number of passengers for the years 1913 to 1920 inclusive. The company contended that the years 1913 to 1916 could not be used as a basis of comparison because the number of zones between Trenton and Princeton had been changed from time to time.

Replying to the claim of the company on the conclusions of the board in relation to the number of persons carried, the board showed that there had been an increase in the number of passengers carried in 1918 and 1919 as against 1917.

It was estimated by the railway that the 10-cent fare for each zone would entail a loss in the number of passengers transported, amounting to 5 per cent, and it claimed further that under the schedule of rates permitted by the board, four out of five passengers would take the ticket rate of 30 cents for the entire trip between this city and Princeton, or vice versa.

The board declared in relation to this estimate that as this amounts to about ten per cent increase, as compared with upwards of 40 per cent increase under the 10-cent fare, it is apparent that the company would not lose 5 per cent under the schedule permitted by the board, and that an estimate of 1,655,000 passengers carried by the company in a year, as shown in the report of the commission in June, was based on facts.

The board emphasized the fact that the Johnson company would, under the 8-cent zone fare, receive 32 cents per rider between Trenton and Princeton, while the Trenton & Mercer County Traction Corporation, the competing company, receives but 24 cents for the same trip.

Regarding the alleged error by which the company contended it would meet with a deficit of $6,000, the board asserted that even if this were true, it would be offset by a saving of that amount made by the company by a reduction in wages of its employees.

Charlottesville Sells Transportation

The Charlottesville & Albemarle Railway, Charlottesville, Va., can well be proud of its record—it has never stopped paying dividends on either its common or preferred stock and is still operating on a 5-cent fare. The retention of the nickel ride has increased patronage, especially in small towns with short rides. With the aid of newspaper ads the company has been putting across to the public the important rôle of the electric carrier.

Over one million passengers carried on the street cars during the past year with no accident of any kind to any of them.

The street cars are the safest and cheapest means of transportation in Charlottesville. Use them often; we appreciate your patronage.

Don't envy the man with the automobile, when you can use a 70-horsepower electric limousine, all lighted, heated and ventilated, for one nickel, five cents. No radiator to freeze, no tires to replace. Use the street cars, we appreciate your service.

C. & A. Ry. Co.

Safety Work Alive on Interurban

During the last five years the Chicago, North Shore & Milwaukee Railroad has decreased its fatal accidents 77 per cent and decreased its accident costs to less than one-third of the average for all electric railways of the country. How extensively safety work is being cultivated by the employees of this railway is shown in the following letter which was received recently by a trespasser on the tracks of the railway between Chicago and Milwaukee. As an electric train whizzed past him at the rate of 60 miles an hour the motorman threw out this communication:

Don't you realize there is serious danger to any one walking these tracks, owing to the fact that our cars are run at high speed? If the motorman should fail to see you in bad weather, or while rounding a curve, or for some other reason, you would be placed in imminent danger of being killed or injured.

It is our desire to cultivate the safety work on this road to a point where every accident of an avoidable character will be eliminated, and we hope that you will at once discontinue walking on these tracks so that the chances of your being injured or killed will be done away with.

Yours truly.

CHICAGO, NORTH SHORE &
MILWAUKEE RAILROAD.

School Ticket System in Force

Bulletin of Cincinnati Traction Company Describes Regulations Prescribed by Ordinance

Regulations to govern the method of selling the 5-cent fare strip tickets to children attending Cincinnati's public and parochial schools as required by an ordinance recently adopted by the municipalities of Cincinnati and Norwood are contained in a bulletin issued by the Cincinnati (Ohio) Traction Company.

The 5-cent school tickets will be sold only in blocks of forty rides for $2 or in blocks of ten rides for 50 cents. The forty-ride tickets are intended to supply two rides each day for twenty school days in the month and will be sold on certain days in each month at the several high schools, by a representative of the traction company.

Walter Draper, vice-president of the traction company, said that by selling a month's supply at a time to the high school pupils the confusion of frequent sales and interference with classes as well as the employment of many additional agents by the company would be avoided. It can readily be understood, Mr. Draper said, that the school pupil tickets could not be put in the hands of the conductors for sale.

The tickets are good on all lines of the Cincinnati Traction Company and the Ohio Traction Company for school children ten years and over and under eighteen years of age and for use in going and coming from school.

The ordinance under which the tickets will be sold does not provide for the use by children attending private schools. The ordinance states that the school children's rate of fare shall be good for all children under eighteen years and the company in its regulations which must be approved by the city is compelled to adhere to this restriction. The ordinance specifically provides that the school fare shall be only by ticket. Conductors cannot accept cash less than the current cash fare for adults and children.

Mr. Draper said the tickets will be sold under the regulations previously outlined, which are temporary and may be changed later if found necessary to meet conditions. The plan for selling the tickets has been approved by Jerome Kuertz, director of street railways.

If at any time when the company's representative visits a school for the purpose of selling the month's supply of tickets any pupil has not used up the full number of rides on a strip already held, and the number of rides so unused is not sufficient for the succeeding twenty days, the unused portion of such ticket may be redeemed by being credited on the purchase of the new ticket.

Each pupil will be furnished with a certificate which must be filled out and signed by the principal of the school. This application must be presented to the representative of the traction company when purchasing tickets.

Railway Offers Motor Bus Service

Judge John O. Chapin, attorney for the Niagara Gorge Railway, Niagara Falls, N. Y., has returned to the village of Youngstown a proposed franchise for running regular trolley service between Niagara Falls and Youngstown during the winter months. The company claims there is not sufficient patronage to continue more than two round trips daily between the two points. The Gorge line proposes to run two-hour motor bus service if the village will give the line a permit.

Trackless Trolley or Buses, Which?

Negotiations are under way between the City Council of Buffalo and the International Railway for the operation of trackless trolleys in Bailey Avenue between Broadway and the north City line, a distance of almost 5 miles. Residents in the so-called Kensington-Bailey section of the city appealed for railway service, but the company says it cannot finance the laying of tracks in the street at this time and has suggested the use of trackless trolleys or large motor buses. There is said to be some objection on the part of residents to the use of buses.

Transportation News Notes

Will Charge Ten Cents.—A 10-cent rate of fare went into effect on the lines of the Aberdeen (S. D.) Railroad on Oct. 3. Coupon books are sold at the rate of 7½ cents.

Temporarily Suspends Increased Rates.—The Illinois Public Utilities Commission has suspended until Feb. 2, 1922, the proposed advances in freight rates sought by the Rockford & Interurban Railway, Rockford, Ill.

Mail Service Established.—United States mail service has been established on the Illinois Traction System's limited trains between Springfield and Peoria, saving twelve hours as compared with the steam road schedule. Two limited cars each way daily between Peoria and Springfield will carry the mail.

"Stop" Signs to Be Installed.—In order to help residents of Atlanta, Ga., to know where to board the electric cars of the Georgia Railway & Power Company 2,400 stop signs are being put up in all parts of the city. It is estimated that it will take one month before final installation of these signs.

May Try Trolley Bus.—After a conference with Sir Adam Beck, chairman of the Hydro-Electric Commission, Toronto, Ont., on the transportation problems of Peterboro, a deputation of Peterboro's City Council has returned and has announced that the trackless trolley may be installed in Peterboro as an experiment.

Freight Service To Be Abandoned.—The Philadelphia (Pa.) Rapid Transit Company has filed a new tariff with the Public Service Commission discontinuing all freight service on its line effective Oct. 31. No reason has been officially assigned for this, but it is believed that the profit is too small to warrant its continuance.

Buses Must Have Two Doors.—Interurban bus operators in Ohio were notified recently of a new ruling of the Public Utilities Commission that they would have to provide two doors for each bus before Dec. 1. There must be one each side or one side and rear. This is one of the first regulatory measures taken by the commission under the Graham law.

Railway May File Rates.—The State Railroad Commission has given permission to the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., to file its present interurban rates between Kenosha and Racine as a permanent schedule. At the same time the commission authorized the 7-cent rate in Kenosha and a maximum of 10 cents for travel outside of city.

Lower Jitney Fares in Effect.—Jitney fares in Youngstown, Ohio have been lowered to conform to the reduced rate of fare on the lines of the Pennsylvania-Ohio Electric Company, which operates in that city. The tickets which will sell at three for 25 cents, six for 50 cents and twelve for $1, will be effective on all jitneys driven by members of the Elm Street Jitney Association.

Contenders Must File Briefs.—The Grand Rapids, Grand Haven & Muskegon Railway, Muskegon, Mich., an interurban, is having its troubles with the jitneys. It has sought an injunction to restrain the buses from operating. Judge Cross of the Ottawa Circuit Court has refused to grant the restraining order but has given both sides ten days in which to file briefs.

Wants Lower Fare.—The City Council of Niagara Falls, N. Y., will make an attempt to have the international Railway lower its rate of fare between Niagara Falls and Buffalo over the new high-speed interurban line. The round-trip fare is now $1.30 compared with 50 cents before the war. The question of filing a complaint with the Public Service Commission is now with Corporation Counsel R. J. Moore.

Reduced School Fares.—The Augusta-Aiken Railway & Electri Corporation, Augusta, Ga., has reduced its rate of fare for all bona-fide school teachers and pupils to 5-cents a ride. The company will sell books of forty-four tickets for $2.20. At the present 10-cent cash fare the books at $2.20 represent a saving of $2.20 and for those using the 8-cent tokens the saving will be $1.32.

Railroad Will Operate Stages.—The first example of a steam railroad operating autos became public when the California State Railroad Commission authorized the Pajaco Valley Consolidated Railroad to operate stages in place of some of the unprofitable trains. Between Salinas and Spreckles paralleling the rails auto stages will be run on the highways. Passengers, baggage and express will be carried at the same rate as on the trains.

Plan Offered for Through Service.—Operation of through electric cars between Toronto and Buffalo by way of Niagara Falls and the high-speed electric line of the International Railway is proposed by the Ontario Hydro-Electric Commission of Canada. T. A. Wilkinson of the provincial hydro commission's engineering staff, has been making an investigation of the feasibility of such a plan. A report soon will be made to the commission.

Must Perform Extra Services.—Supervisors of the Los Angeles (Cal.) Railway are now required to be capable of working on the emergency telephone board as well as handling traffic in the streets. The telephone men, formerly called dispatchers, now rate as supervisors. Arrangements have been made whereby all supervisors will spend a certain period in the emergency telephone work and an equal period in outside traffic work.

Decrease in Freight Rates Announced.—The Northwestern Ohio Railway & Power Company has filed a freight rate decrease on its lines from Ryan, a Toledo suburb, to Marblehead, Ohio. The decrease will be 20 per cent effective Oct. 13. Rates from Toledo remain the same on account of terminal rates. It is believed motor truck feeders and enlarged freight handling facilities at Ryan will enable much Toledo freight to take advantage of the decrease in rates.

No Fare Increase at Present.—Despite the fact that the stabilizing fund of the Toledo, Bowling Green & Southern Traction Company lines at Findlay has fallen from $20,000 to approximately $10,500 under the service-at-cost franchise granted a few months ago, there will be no raise in fare at the present time. The present fare is 10 cents cash, seven for 50 cents, or two for 15 cents. Increase fall business is expected to fill the stabilizing fund again.

Jitney License Transfers Attacked.—The Public Service Railway, Newark, N. J., will ask the Supreme Court to decide if the intent of the law passed last winter regulating jitneys is that license transfers should be treated the same as new applications. The company contends that they should be. The upholding of its view would mean that each transfer applicant would have to prove that continuance of the bus on a street through which electric railways run is a necessity and convenience. The commission has held that existence of the bus on a line justified its continuance if the ownership were unchanged. A writ of certiorari will be asked from the Supreme Court to test the question. The case of Carl A. Becker of West Orange, to whom the board recently granted a transfer of a Newark-West Orange line bus, will form the basis for the suit.

Personal Mention

Mr. Wakelee Assumes Additional Duties

Edmund W. Wakelee has assumed the title of general solicitor of the Public Service Railway in addition to his duties as vice-president of the corporation and its subsidiaries. The position was made vacant a short time ago by the death of L. D. Howard Gilmour.

Mr. Wakelee joined the Public Service law department about nine years ago as assistant general solicitor. He has represented the company in its dealings with municipal bodies, state agencies, etc. He became at once a member of the executive committee of the operating companies and of the public relations committee of the corporation.

During the formative period of the New Jersey & Hudson River Railway & Ferry Company (now the Bergen division of the Public Service Railway) Mr. Wakelee was its legal representative and was receiver for one of the underlying companies. He was also head of the legal firm of Wakelee, Thornale & Wright.

George H. Blake has been appointed assistant general solicitor. Mr. Blake has for years been one of the trial attorneys in the Public Service organization, devoting his time principally to the handling of claim department cases. Mr. Blake has been a member of the bar since 1908.

Retires After Fifty Years With I. R. T. and its Predecessors

Thomas Gerehart, general claim agent of the Interborough Rapid Transit Company, New York, and the company's oldest employee in the point of service, retired on Aug. 31. His initial connection with railways began shortly after the close of the Civil War in 1867 when he entered the employ of the West Side & Yonkers Patented Railway as a timekeeper, paymaster and bookkeeper, at which time the method of propulsion or operation was by means of an endless chain. In 1871, when steam engines were first used on the elevated, he acted as conductor and bookkeeper and when the New York Elevated Railway purchased the West Side Company he became cashier and bookkeeper. He was promoted to the position of assistant secretary and treasurer in 1878, which position he held up to 1890 when the Manhattan Railway took over control. He was retained by the Manhattan Railway as assistant secretary and treasurer until 1895, when he was appointed claim agent and continued in that capacity for nine years, when he was appointed general claim agent of the Interborough Rapid Transit Company.

During his long career he inaugurated a number of principles in the investigation and adjustment of claims which have retained their value against changes of time and conditions.

Mr. Titcomb's Successor

D. W. Pontius, Manager of San Diego & Arizona Railway, Elected to Pacific Electric Post

D. W. Pontius has been elected vice-president and general manager of the Pacific Electric Railway, succeeding H. B. Titcomb, recently made president of the Southern Pacific Railroad of Mexico and the Arizona Eastern Railway. Mr. Pontius will be in full charge of all departments of the railway and will also be president of the Pacific Electric Land Company.

D. W. PONTIUS

Mr. Pontius has been connected with Southern Pacific interests about thirty years, filling successively the positions of telegraph operator, station agent, trainmaster, district freight and passenger agent, and was first connected with the present Pacific Electric lines as traffic manager of the Los Angeles Pacific Railway, which consisted of the electric lines now serving the west coast beach resorts, Santa Monica to Redondo Beach, inclusive.

On Nov. 1, 1911, when the several electric lines of Southern California were consolidated with the Pacific Electric Railway, Mr. Pontius was selected as traffic manager, and filled that position until four years ago when he was appointed general manager of the San Diego & Arizona Railway at San Diego. That company is owned jointly by the Southern Pacific and J. D. and A. B. Spreckels, representing an investment of $18,000,000.

Mr. Pontius's task was to complete construction of the line, with its attendant engineering difficulties, arrange for the purchase of the equipment and place it in operation for the handling of transcontinental traffic between San Diego and the East. A greater part of this work was carried on during the World War and the resultant financial stringency, but was finally accomplished and means much to Southern California as a whole and San Diego and the Imperial Valley in particular.

Mr. Pontius will be succeeded as general manager of the San Diego & Arizona Railway by A. T. Mercier, who is superintendent of the Oregon lines of the Southern Pacific, which comprise 1221 miles of steam-operated railroad; three electric railway systems located at Salem, Eugene and West Lynn, and 150 miles of interurban railway radiating out of Portland.

Dean Cooley Heads American Engineering Council

Mortimer E. Cooley, dean of the Colleges of Engineering and Architecture of the University of Michigan, has been chosen by the organized engineers of the United States to take up the task laid down by Herbert Hoover when he became Secretary of Commerce. In announcing Dean Cooley's election as president of the American Engineering Council of the Federated American Engineering Societies, the executive board of the council outlines some of the problems which will face the new President.

Among these questions are unemployment; government reorganization, involving the establishment of a Department of Public Works and reform of the United States Patent Office; legislation by the various states on the registration of engineers; elimination of industrial waste and regional organization of the engineers of the nation along lines marked by Secretary Hoover and his associates in the council.

Dean Cooley is perhaps best known in the electric railway field because of his pioneer work in making valuations. In 1902 Mr. Cooley assisted in the appraisal of the mechanical equipment of Newfoundland railways, and in 1903 acted as consulting engineer in the Wisconsin railroad appraisal. In 1906 he was a member of the Traction Valuation Committee, Chicago; in 1907 appraised Michigan telephone properties; in charge of appraisal of hydro and steam-electric properties and railroads for the Michigan Railroad Commission since 1910. More recently he was in charge of making a valuation of the Public Service Railway, New Jersey. The total value of the property with which he has been concerned in appraising is about a billion and a half dollars ,of which 85 to 90 per cent has been devoted to the public use.

It is understood that Professor Cooley has made arrangements which will enable him to give one-fourth of his time to active work for the organization, while leaving him sufficient opportunity to maintain his progressive upbuilding in the University of Michigan, which he has served forty years.

Frank G. Whitney, for the past fifteen years superintendent of substations, electric division, New York Central Railroad, has resigned to become superintendent of the Dutch Point Power Station, Hartford (Conn.) Electric Light Company. A farewell banquet was given in Mr. Whitney's honor on Sept. 22 by one hundred of his associates and employees of the New York Central Railroad. Mr. Whitney was presented with a handsome watch and a traveling bag as tokens of their esteem.

Obituary

L. E. Purnell, manager of the Cleveland office of the Ajax Metal Company, Philadelphia, died suddenly on Oct. 6. The Cleveland office will be continued in charge of an assistant until Mr. Purnell's successor is appointed.

E. M. Musier, cashier and paymaster of both the Eighth Avenue and Ninth Avenue Railroad Companies, New York, since they were returned to their original owners for operation on Aug. 1, 1919, died on Sept. 14. Mr. Musier had previously been with the Brooklyn (N. Y.) Rapid Transit Company for many years and prior to that was connected with the West Shore Railroad.

Henry C. Moore, formerly president and general manager of the Trenton (N. J.) Street Railway, died in Boston on Oct. 5. He was a member of the board of directors of the United Power & Transportation Company, Reading, Pa., which operated the traction lines at that place and at Trenton, N. J. Twenty-six years ago he was sent to Trenton to become president and general manager of the Trenton Street Railway. Mr. Moore was born in Philadelphia sixty-nine years ago and received his education there.

William Otis Chapman, Jamaica Plain, Mass., died on Oct. 6. He was born in Canton, Mass., seventy-one years ago. Mr. Chapman early in life, through his father, who was one of the organizers and builders of the Union Pacific Railroad, became interested in railroad enterprises, and more particularly in street railway and interurban railway construction. He was prominent in the building of the Braintree & Weymouth Street Railway, Braintree, Mass., and was part owner of the company until some years ago, when he sold his interests. He later became associated with the firm of Stone & Webster, and during his connection with that company he was in charge of the construction in Massachusetts of the old Blue Hill Street Railway, the Plymouth & Kingston electric line and also the Canton Street Railway. In 1890 Mr. Chapman built the electric railway between the towns of Hancock and Houghton, in the copper regions of Michigan, which was considered an extremely difficult piece of engineering.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Governor Harding Thinks Business Has Turned the Corner

In an extended article in the November issue of *System*, W. P. G. Harding, governor of the Federal Reserve Board, explains why he thinks business has turned the corner. He says among other things that since the first of the present year up to Aug. 31, loans of the federal reserve banks to their member banks have decreased about $1,200,000,000, and as the notes discounted with federal reserve banks have been paid off, the federal reserve note currency has come back to the banks and in the absence of a demand for it has not been reissued. Other facts which he cites are as follows: The movement of prices, which has been steadily downward, has checked itself; the public has a great deal of buying power left and buying power begets buying power; the wholesale price index number which reached 272 now stands near 148; the total volume of federal reserve notes in circulation which showed an almost continuous upward trend during 1920 since then has been greatly reduced; when one important industry resumes, others automatically revive and industries are reviving.

Unfilled Steel Orders Increase

The United States Steel Corporation has just reported the first increase in forward business that has taken place since July, 1920. Unfilled orders as of Sept. 30 amounted to 4,560,670 tons, as against 4,531,926 tons on Aug. 31, an increase of 28,744 tons. While the increase was not large, the very fact that there was an increase was considered as one of the outstanding factors indicating a turn in the industry. The gain in forward business indicated a distinct picking-up in demand, for operations of the Steel Corporation were at a much higher scale than in the preceding month, and consequently for an increase in bookings to be recorded there had to be a decided expansion of demand.

The scale of activity of the corporation during September ranged between 30 and 40 per cent., the latter figure having been attained toward the close of the month. Production was probably in the neighborhood of 450,000 tons of finished steel during the period, so that incoming orders may have reached 500,000 tons, since some of the business during the month probably represented shipments from stock. The major portion of the new business taken by the corporation was in light products, notably sheet and wire goods. For some time sheet mills have been operating at a scale much higher than other departments.

The peak of unfilled tonnage was reached in April, 1917, when bookings amounted to 12,183,083. There was practically a steady decline until May, 1919, when bookings increased, ultimatly advancing to 11,118,468 in July, 1920. Another decline set in, which continued until September of this year.

Insulation Market Stronger

With the higher prices ruling for cotton yarns and cloth, the insulation market is on a little stronger basis and buying has been reported more active. The principal increase in buying has been noted in the field concerned with repair and maintenance work rather than in new manufacturing. Electric railway properties have shown considerable activity in this respect in the last three weeks in comparison with the light buying from that direction during the summer. Cotton insulation and cotton and rubber tapes are also moving well, and a noticeable increase in the purchases of mica is found. This is not only in insulation but also in tubes and washers for grid insulation, undoubtedly in anticipation of the winter's needs.

Some further price advances since Sept. 20 have been noted in varnished tapes and cloth. These have been around 10 per cent. Cotton yarns and gray goods at the mills have gone up again, and when insulation manufacturers come into the market for further supplies it is expected that still further advances in the price of finished insulation will result. Then, too, stocks of cotton cloth at the mills have been reduced and a temporary shortage may result. Mica prices have risen but slightly.

Copper Demand Still Strong

Copper is 13 cents a pound delivered to domestic consumers for October and November. Several million pounds of copper were sold in the export trade recently. Domestic demand continues good. Most producers are rather unwilling to sell at present quotations, so that it is becoming quite difficult for other than the larger buyers to obtain November deliveries at 13 cents. How much further prices will rise on the present buying movement would seem to depend upon how much of present buying is for early consumption and how much is advanced buying to take advantage of present prices on the supposition that producers will during the coming year adopt a wiser and more farsighted price policy than during the first nine months of the present.

Upward Trend in Coal Production

For four weeks in succession the production of soft coal has climbed steadily upward. The total output during the week of Oct. 1, including lignite, coal coked at the mine and railroad fuel, is estimated at 8,876,000 net tons. Compared with the week preceding this was an increase of 348,000 tons, or 4 per cent. The week's production was the largest since last January.

Electrical Sheet Prices Steady

Sheet production is running pretty high, one mill operating at about 85 per cent capacity. Electrical sheet operation is on a low basis, on the other hand, in line with the buying by electrical apparatus manufacturers, with considerable stock still on hand. Prices on this material are holding, no advance having been made with the September sheet advance and not immediate advance being contemplated, it is reported, on a newly announced rise of five dollars in sheets in several districts.

Buying Increased in Some Quarters

Slightly larger orders, more of them and a generally firmer tone to buying have been the characteristics of late of conditions among those dealing in electric railway supplies. This tendency of increased activity has been manifested by more numerous inquiries for material on which the frequency of replacement is necessarily rather high. The principal activity is seen in the standard items of gears, gear cases, brake-shoes, trolley wheels, etc. With respect to equipment and supplies which depend essentially for their sales on the purchase of new rolling stock, there have been practically no changes in the volume of sales recorded or number of inquiries received.

One manufacturer states that the prices of car equipment, especially motors, controllers, etc., have reached a level as low as present costs will permit. When it is considered that both copper and steel prices seem to be on an upward trend and that the average of wages paid to labor is but 40 per cent above the pre-war scale, it appears as though equipment prices cannot be lowered appreciably.

Electric railways, according to several manufacturers, have responded to the decrease in line and overhead material announced over a month ago by a favorable increase in buying. This condition exists notwithstanding that demand for line supplies has been somewhat above the average for a considerable period. Railways are undoubtedly anxious to benefit by reductions that have followed lowered copper prices, which they realize will probably not soon fall to such low levels.

Also the demand and sales of armature coil winding machines and other labor saving shop tools are reported to be still very active.

Manufacturers, in general, are optimistic over the volume of business which they think should develop in the near future, for with improving financial conditions that are being announced almost daily the long-delayed yet necessary rehabilitation of rolling stock will result in good buying of equipment by car builders.

Rolling Stock

Brooklyn (N. Y.) Rapid Transit Company recently placed an order for 400 illuminated curtain signs to be used on its new subway cars, an order for 100 of which was placed some time ago.

Pacific Electric Railway, Los Angeles, Cal., has just added thirty new interurban cars to its service. Some of them will be put on the Los Angeles-San Bernardino line and others will be run from Los Angeles to the beaches. The cars, costing $48,000 apiece, are the latest type of interurban electric railway cars. They are practically the same as the cars on the Los Angeles-San Bernardino line, with the exception that they are equipped with leather-cushioned seats instead of plush cushions. All the interurban cars of the Pacific Electric are to be equipped with leather seats as the cars go into the shops for repairs.

Track and Roadway

Valdosta (Ga.) Street Railway has replaced all of the old cross ties with new ones in the northern part of the city.

Tri-City Railway & Light Company, Davenport, Ia., is replacing its present light rails with heavier rail, the relaying being done between Clinton and Davenport with 85-lb. rail.

Eastern Massachusetts Street Railway, Boston, Mass., is doing a great amount of track improvement work. A 75 lb. rail is being laid for a half mile on the Lawrence line, taking the place of the old 48 lb. rail. On the Reading line to State Street, Tewksbury, the rails are being welded. The company also hopes to relay the rails in Central Street. Work is also in progress between Merrimack and Market Streets.

Public Service Railway, Newark, N. J., may be compelled to raise and maintain the trolley tracks in North Broad Street, Hillside, N. J., from the Elizabeth city line, during the repairing of that section of the thoroughfare. The Union County Board of Freeholders has filed a petition with the Board of Public Utility Commissioners to this effect. The trolley company refused to do the work, claiming that it did not have the necessary finances.

Pittsburgh (Pa.) Railways are seeking permission through the receivers to make the following repairs. New flooring in the Fleming Park Bridge at a cost of $31,000; reconstruction of double tracks on West Carson Street between the Point and Smithfield Street bridges. This repair would require 2,100 ft. of double track at a cost of $96,800. Permission is also sought to lay 1,700 ft. of single track in Wabash Avenue from Plank to Independence Street at a cost of $24,200 and for placing 410 ft. of single track along Independence Street to Woodville Avenue at a cost of $6,600.

San Diego (Cal.) Electric Railway began, on Sept. 6, relaying its tracks and paving on Broadway between Third Street and the Union Station. The new work will cost approximately $100,000 and all possible man-power will be employed to complete the work with as little delay as possible. The section of track to be relaid and repaved is approximately ½ mile long and, being double track throughout, will make a total of about 1 mile of new track. The type of construction will be of the most modern and approved character so far undertaken by any electric railway on the Pacific Coast, according to William Clayton, vice-president and managing director. An innovation so far as the San Diego Electric Railway's construction is concerned will be the incasing of the steel ties in solid concrete, eliminating entirely the use of the loose rock ballast heretofore employed with the wooden ties. The rails will be 114-lb. section. The use of the solid concrete incased ties is expected to produce a superior roadbed and add to the life of the track.

Power Houses, Shops and Buildings

Toronto (Can.) Transportation Commission, which took over the railway system on Sept. 1 last has a force of approximately 2,000 men engaged in the work of reconstructing various lines. At the Coxwell Avenue carhouse drainage, trackage and and switches have been installed and forty of the new cars ordered by the Commission are on sidings ready to be operated as soon as a wider devil strip is available. New car routes are also to be constructed on Blantyre Avenue, Coxwell Avenue, Carlaw and Pape Avenues and Broadview Avenues all in the east end. It is also expected that the commission will be able to complete arrangements with York Townshop Council for the extension of the crosstown lines running east on Danforth, Gerrar, Dundas and Queen Streets,

Trade Notes

Walter R. Pflasterer, railway sales engineer of the National Carbon Company in the Chicago territory, resigned on Sept. 1 to enter business for himself. He has organized the District Sales Company and is general sales manager with headquarters at 431 South Dearborn Street, Chicago. The District Sales Company will act as manufacturerers' representatives handling railroad accounts in the Chicago district. Mr. Pflasterer has been connected with the National Carbon Company since 1914 when he entered their employ as sales engineer in the railroad sales department.

Sidney G. Down was appointed, effective Oct. 1, to the newly created office of general sales manager of the Westinghouse Traction Brake Company and Westinghouse Air Brake Company, with headquarters at Wilmerding, Pa. Mr. Down was formerly Pacific district manager of the Westinghouse Air Brake interests and president of the Westinghouse Pacific Coast Brake Company. Mr. Down joined the Westinghouse Air Brake organization twenty years ago, coming from the Michigan Central Railroad where he was employed as general air-brake inspector and instructor. He spent several years as instructor on the Westinghouse Air Brake Company's instruction car and was later appointed mechanical expert, with headquarters in Chicago. Eleven years ago he was appointed district engineer and transferred to San Francisco. Shortly afterward he was made Pacific district manager. Mr. Down was largely responsible for the organization of the Westinghouse Pacific Coast Brake Company, located in California, and when it was formed was placed in charge of its activities with the title of vice-president and later president.

New Advertising Literature

American Insulated Wire & Cable Company, Chicago, has completed arrangements for circulating the new leather-bound vest-pocket catalog on its "American Brand" wire and cable.

Elliott Company, Jeanette, Pa., has just issued two new bulletins. N-1 is on the "Deaëration Process" as applied to power, central-station and heating plants to prevent corrosion, and N-2 is on the "Deaëration Process" for hot-water service.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., produced, primarily for distribution prior to and at the recent convention of the American Electric Railway Association, a publication, entitled "Review of Electric Railway Problems." This publication covers the subjects of mass transportation, multiple-unit control, recent railway motor developments, interurban service, freight haulage, snow fighting, automatic substations, the safety car, the trolley bus, replacements of obsolete equipment, maintenance of electrical equipment, and there are several pages devoted to a description of various items of Westinghouse equipment such as electrically heated ovens, solder and babbitt pots, electric-arc welders, electric glue pots, etc. The last two pages of the book are devoted to a brief description to each of the important up-to-date railway publications available for distribution by the Westinghouse company.

—Built for safer safety cars

The Peacock Staffless Brake

Simplicity of Construction

With its great leverage, ample chain winding capacity and simple but rugged construction, the Peacock Staffless Brake meets all the exacting requirements for an emergency brake on a safety car.

It doesn't take a powerful man to operate it. The old man or the short slender fellow has as complete control with the Peacock Staffless Brake as the burliest young husky. Just a quick turn or two, and braking pressure is applied up to the maximum holding power of wheels against rails.

And in the big housing below the drum, there is ample room to wind up any amount of chain that can come in, even if extreme slack should exist in the rigging. The chain passes over the drum, and cannot slip on it, but does not wind around it. Therefore it cannot catch or bind.

Demand Peacock Staffless Brakes for safer safety cars!

National Brake Company
890 Ellicott Sq., Buffalo, N. Y.

Bankers and Engineers

Ford, Bacon & Davis
115 BROADWAY, NEW YORK
Detailed Examinations by Experts
REPORTS FOR FINANCING COVERING
Costs Valuation Reserves Turnover Rates
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ON
INDUSTRIAL AND PUBLIC SERVICE PROPERTIES
NEW YORK BOSTON CHICAGO

SANDERSON & PORTER
ENGINEERS
REPORTS, DESIGNS, CONSTRUCTION, MANAGEMENT
HYDRO-ELECTRIC DEVELOPMENTS
RAILWAY, LIGHT and POWER PROPERTIES
CHICAGO NEW YORK SAN FRANCISCO

THE ARNOLD COMPANY
ENGINEERS—CONSTRUCTORS
ELECTRICAL—CIVIL—MECHANICAL
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ELECTRIC RAILWAY ENGINEER
WORCESTER POLYTECHNIC INSTITUTE
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Investigations, Appraisals, Expert Testimony, Bridge and Structural Work, Electrification, Grade Crossing Elimination, Foundations, Power Plants

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THE J. G. WHITE ENGINEERING CORPORATION
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Consultant
FARES, BUSES, MOTOR TRUCKS
More revenue from *more* riders
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Consultant and Specialist
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For Electric Railways
Investigations · Tests · Recommendations
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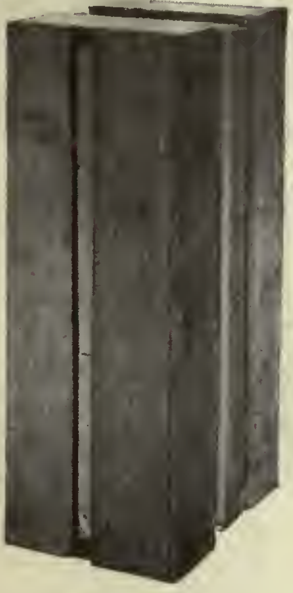
Engineers
Unit Power Plants insure low power costs
Huntington Bank Bldg., Columbus, Ohio

ENGEL & HEVENOR
Incorporated
TRACK
Engineers—Constructors—Maintenance
Appraisals—Valuation—Rehabilitation
Steam and Electric Railroads
Estimates
220 BROADWAY, NEW YORK

White's Porcelain Strain Insulators

Standard Package



We are now packing our insulators in cartons

No mussy sawdust
No breaking
Easily counted
Easier handled and stocked

Standard Carton

Try some of our insulators. They all have a very uniform brown glaze, a very distinctive color, no black spots or discoloration.

T. C. White Electrical Supply Company
1122 Pine Street, St. Louis, Mo.

Brake Shoes

A. E. R. A. Standards

Diamond "S" Steel Back is the Best Type

Standard Patterns for SAFETY CAR

D-67 for Narrow Treads
D-87 for Wide Treads

American Brake Shoe and Foundry Co.
30 Church Street, New York
332 So. Michigan Ave., Chicago Chattanooga, Tenn.

DAY & ZIMMERMANN, INC.
ENGINEERS
Design, Construction
Reports, Valuations, Management
NEW YORK PHILADELPHIA CHICAGO

A. L. DRUM & COMPANY
CONSULTING AND CONSTRUCTING ENGINEERS
VALUATIONS AND FINANCIAL REPORTS
CONSTRUCTION AND MANAGEMENT OF ELECTRIC RAILWAYS
76 West Monroe St. CHICAGO, ILL.

JAMES E. ALLISON & CO.
Consulting Engineers
Specializing in Utility Rate Cases and Reports to Bankers and Investors
1017 Olive St., St. Louis, Mo.

THE P. EDWARD WISH SERVICE
50 Church St. NEW YORK
DETECTIVES
Street Railway Inspection
131 State St. BOSTON

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

M-J **M-J**

ARMATURE BAB **TURE BABBITT**

Buy Service in Babbitt

The buyer's job would be an easy one if *price* were the only thing to be considered. While price is important, it is by no means the chief consideration. Take babbitt metal, for example. Cheap babbitt won't stand the "gaff" of hard service. It quickly wears and requires constant replacement.

More-Jones Armature Babbitt, on the other hand, may cost a trifle more but it certainly lasts longer, and withstands the constant strain, pounding and vibration to which babbitt is subjected in electric railway service, for the greatest length of time.

So in buying babbitt metal, forget the $ sign and rely on the M-J symbol. It's your guarantee of the biggest dollar for dollar babbitt value on the market today.

MORE-JONES BRASS & METAL CO.
St. Louis Missouri

TROLLEY WHEELS:
V-K Oilless, M-J Lubricated
HARPS: V-K *Non-Arcing*
BEARINGS: *"Tiger" Bronze*
Axle and Armature
ARMATURE BABBITT
and Similar Products

MORE-JONES

Play Safe On Your Poles

When you specify the "P & H" Guaranteed Penetration Process, we assume full responsibility for an 100 percent job of Butt-Treatment for your poles.

We guarantee without quibbling to refund the entire Butt-Treating price on every pole that does not show the specified half inch uniform penetration.

Write for an illustrated description of the "P & H" Guaranteed Penetration Process.

Do not be satisfied with any substitute process. Insist upon the original,—the "P & H."

We produce and sell treated and untreated Northern White and Western Red Cedar Poles;—we can give you any form of Butt-Treatment;—and we are the originators of the Guaranteed Penetration Process—the "P & H."

PAGE AND HILL CO.

MINNEAPOLIS, MINN.

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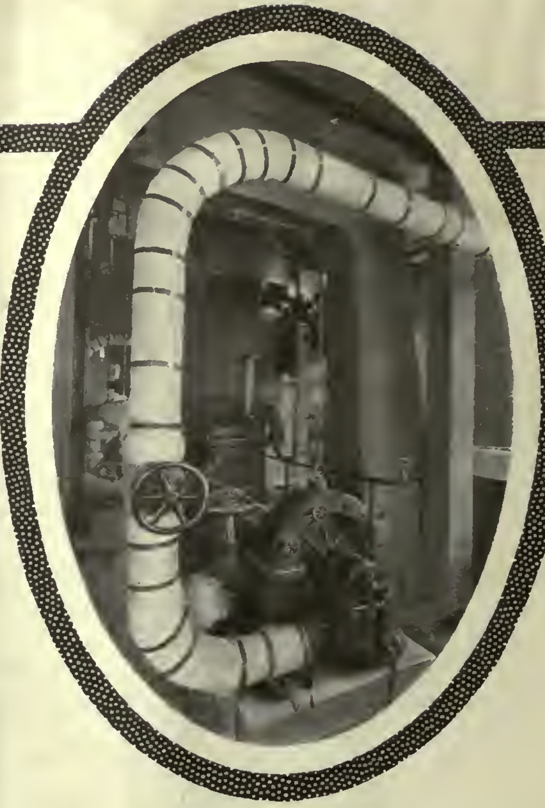
Beneath the Main Unit



One of two Terrys serving condensers for two 2000 Kw. turbines installed at the Slots Sheffield Steel & Iron Co., Birmingham, Ala.

BENEATH the main unit in position, but "back of" the main unit in reliability, lies the condenser. Whether that condenser be barometric, surface or jet, dependable drive for the pumping elements is imperative. Should anything happen to interrupt the service of this drive, the main unit, although it may run non-condensing for a while, must be shut down for a long period before condensing operation may be resumed. As they receive their energy directly from the boiler, Terry turbines are less likely to cause interruption of service. Their performance in hundreds of plants has demonstrated their dependability.

Terry turbo pump units, geared or direct connected, are furnished in all sizes suitable for injection service, circulating, removal or hotwell pumping.

For your next condenser installation get in touch with the Terry engineer in your vicinity, but now write for Bulletin No. 25.

T-743

THE TERRY TURBINE

Offices in Principal Cities
in U.S.A. also in Important
Industrial Foreign Countries

The Terry Steam Turbine Co.
Terry Sq. Hartford. Conn. U.S.A.

Quiet Operation

Special Drop Forged Blanks give pinions with a comparable longitudinal and transverse strength.

Tooth Overlap

Nuttall Standard 7½ deg. long and short addendum type Helical Gears have demonstrated that two or more tooth lap is not necessary for quiet operation.

R.D.NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

All Westinghouse Electric and Mfg. Co. District Offices are Sales Representatives in the United States for Nuttall Electric Railway and Mine Haulage Products.

Nuttall

"STANDARD"

Steel Tires

Steel Tired Wheels

Solid Rolled Steel Wheels

O. H. Steel and Malleable Iron Castings

Solid Forged Gear Blanks

Steel Forgings
Iron Forgings

Forged and Rolled Steel

Pipe Flanges

Ring Dies

Rings

Roll Shells
Steel Springs

S BRAND

"The 'Standard' Brand on your material is an assurance of eventual economy."

S BRAND

STANDARD STEEL WORKS CO.

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ST. LOUIS
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RICHMOND
SAN FRANCISCO
NEW YORK
HOUSTON

MONTEREY, MEX.
MEXICO CITY
LONDON, ENGLAND
PARIS, FRANCE

Another

"Up to the minute" test on

"Tool Steel"

vs.

Special Quenched

The "Tool Steel" pinion wore out after 239,136 miles.

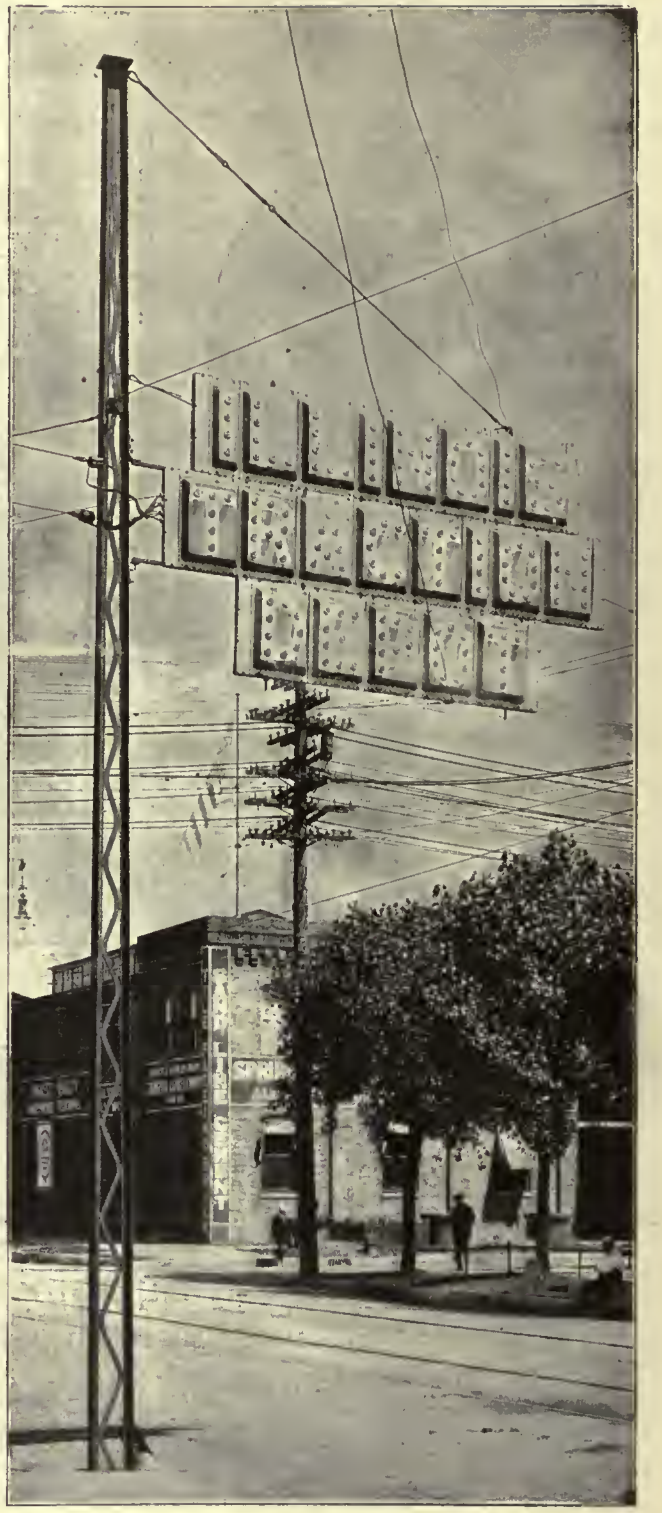
Special quenched pinions wore out in 50,000 to 60,000 miles.

The History of the Test:

In Dec., 1917, test was started to demonstrate if "Tool Steel" could meet the guarantee of 50% greater life. (Guarantee has since been increased to 75% greater). Car. No. 14 was equipped for test with "Tool Steel" gear and pinion on one motor and quenched gear and pinion on another. Micrometer measurements were taken and in the first 29,778 miles, the relative wear on the pinions was .020 in. to .078 in. The quenched pinion was removed and scrapped between 50,000 and 60,000 miles. (Exact record was lost. This mileage checks with the fact that it was half worn in 29,778 miles, also with average mileage they were obtaining for similar pinions on other cars). The "Tool Steel" pinion was worn out in 239,136 miles.

4 to 1
and we guaranteed 75% greater life!

The Tool Steel Gear & Pinion
Company
Cincinnati, Ohio



Bates One-piece Poles Are Artistic

Perhaps Art is a secondary consideration when you plan your pole line construction, but it cannot be disregarded—especially when these poles are to be installed in exclusive residential districts or on your business blocks.

The combination of great utility and art with the lowest first cost makes the Bates Poles desirable for all types of pole line construction.

Our New 1921 TREATISE AND HANDBOOK sent upon request.

Bates Expanded Steel Truss Co.
208 South La Salle Street
CHICAGO, ILLINOIS

Turning a Pair of Car Wheels in 11 Minutes

The Big Chip Tells the Story

Where work is wanted in a hurry our No. 5 Center Drive Car Wheel Lathe has proved itself a hustler. In the Canadian Pacific Railway Shops, Union Depot, Toronto, Canada, the machine pictured below has reduced the turning time on one pair of wheels to 11 minutes—speed 15 ft. per minute, feed ½ in.

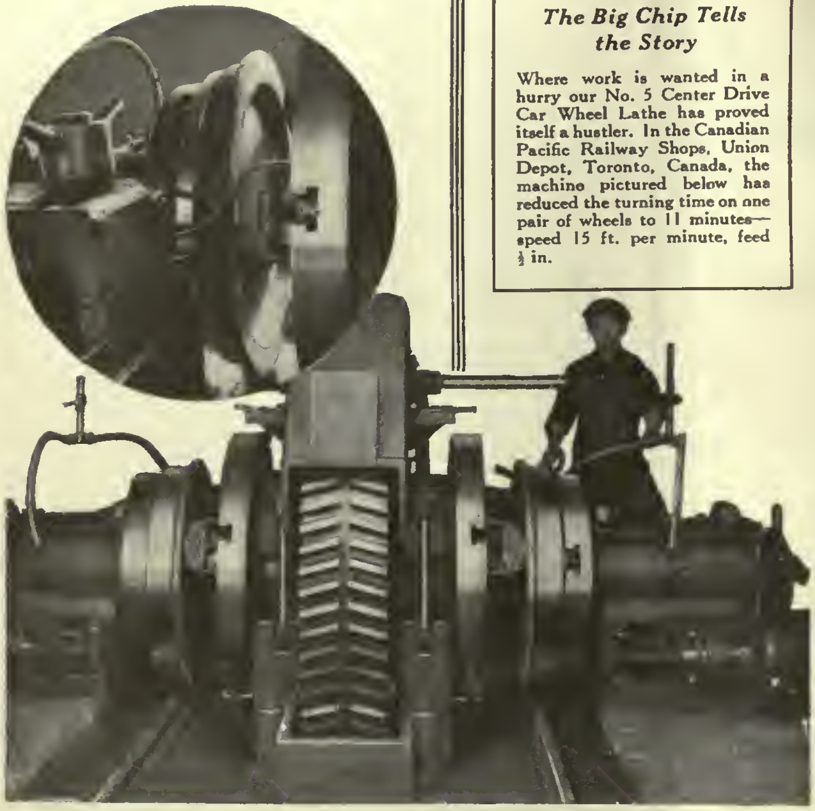
THE high production of which this machine is capable is largely due to the center driving construction with powerful herringbone gear having automatic quick-acting hinged segment to admit the axles.

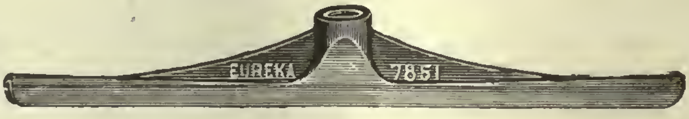
Additional time- and labor-saving features include semi-automatic drivers, pneumatic tool clamps, pneumatically operated tailstocks, push button motor control.

N-B-P Center Drive Car Wheel Lathe

We are in a position to furnish complete machine tool equipment for electric railway repair shops, including car wheel lathes, wheel presses, axle lathes, car wheel borers, etc., as well as steam forge hammers, engine lathes, boring and turning mills, etc., and the electric travelling cranes to serve them.

NILES-BEMENT-POND CO.
111 BROADWAY NEW YORK





Eureka Equipment

Eureka Equipment will help to keep down maintenance costs because it is correctly designed and carefully manufactured from our own special alloys.

We can now make prompt shipments on

- Commutators
- Trolley Wheels
- Trolley Ears
- Brush Holders
- Sleet Trolley Wheels
- Line Material
- Controller Fingers
- Bearings

Write for catalog

The Eureka Company
Northeast, Pennsylvania
120 Broadway, New York

Chillingworth One Piece Gear Case

Made from special deep drawn Open Hearth Steel

End Supported Case weighs 50 lbs.
for Safety Car Motors

SEAMLESS CONSTRUCTION
OFFERS
MAXIMUM PROTECTION
TO YOUR GEARS

Built for Service

Chillingworth Manufacturing Co.

Jersey City, N. J.

Chicago Office
H. F. Keegan Company
1241 First National Bank Bldg.

Pittsburgh Office
Union Electric Company
933 Liberty Street

After the Convention—What?

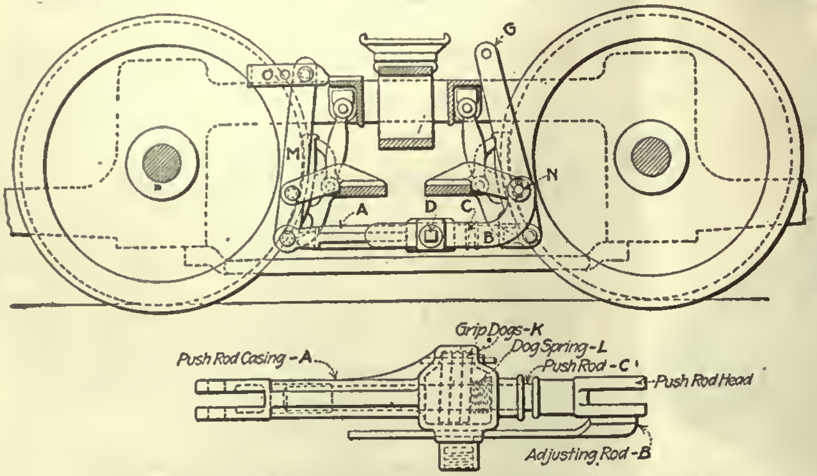
The 1921 Convention is over, but there still remain the inspiration of the meetings, the pleasure of old acquaintances renewed and the spirit of optimism that prevailed. Looking forward we see on all sides evidences of the coming of better times. There will be more and better business for those who aggressively advance to grasp it.

Transportation Service which is better, faster, more frequent and withal cheaper—this is the only safe foundation for an advance toward your share of future prosperity in this industry.

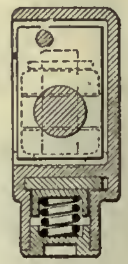
St. Louis Quality Safety Cars in many localities are already demonstrating their ability to compete successfully for the best of the business in the community.

St. Louis Car Company
St. Louis, Mo.
"The Birthplace of the Safety Car"

Brake-Rigging Continuously Taut with—



Details of the Gould Type Slack Adjuster as applied to an Electric Car Truck



GOULD Slack Adjuster

Specified by United Railways & Electric Co., of Baltimore, for latest safety cars.

How often you notice a motorman running with brakes partially set up, due to over-anxiety to be sure that all the slack is out of rigging. The waste of power and wear on brake shoes in such cases is appalling.

Remove the incentive to run with brakes set up, by installing Gould Automatic Slack Adjusters, which keep the brakes always ready for instant response to the operator's effort. Incidentally you will save materially on shop expense, which occurs from the necessity of frequent manual adjustments of brake rigging when it is not taken care of by Gould automatic adjusters.

Write today for further information

GOULD COUPLER COMPANY

30 East 42nd St., New York City **Works: Depew, N. Y.** **The Rookery, Chicago, Ill.**

If there is anything you want

that *other* readers of this paper can supply, look for it in the

SEARCHLIGHT SECTION

—the "Opportunity" advertising of this industry

If you have anything to offer, advertise it in the "Searchlight" for quick results.

For Every Business Want—"Think Searchlight First."

Agencies Wanted
Agents Wanted
Auction Notices
Buildings For Sale
Business Opportunities
Contracts To Be Let
Educational Courses
Employment Agencies
Exchanges
For Rent Items
Industrial Sites
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New Industries Wanted
Partners Wanted
Patent Attorneys
Patents For Sale
Positions Vacant
Positions Wanted
Property For Sale
Receivers' Sales
Representatives Wanted
Salesmen Wanted
Second Hand Machinery
Plants For Sale

See the Searchlight Section in this issue.

[illegible]

TRUCK WITH TOWER IN RUNNING POSITION

This 3-Section

TRENTON TOWER

is not only more convenient, but stronger than the older type.

The top section is reinforced by the intermediate section. The 3-section design makes it possible to raise the platform 16 inches higher and drop it 12 inches lower than can be done with the old-style 2-section tower.

We'll gladly send you details.

J. R. McCARDELL CO.
Trenton, New Jersey, U. S. A.

Drip Points for Added Efficiency

They prevent creeping moisture and quickly drain the petticoat in wet weather, keeping the inner area dry.

The Above Insulator—No. 72—Voltages—Test—Dry 64,000, Wet 31,400, Line 10,000.

Our engineers are always ready to help you on your glass insulator problem. Write for catalog.

Hemingray Glass Company
Muncie, Ind.
Est. 1848—Inc. 1870

Peirce Forged Steel Pins with Drawn Separable Thimbles

Your best insurance against insulator breakage

Hubbard & Company
PITTSBURGH, PA.

Transmission Line and Special Crossing Structures, Catenary Bridges

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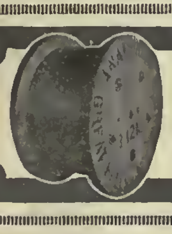
Engineers and Contractors SYRACUSE, N. Y.

Electrical
Wires
and
Cables

JOHN A. ROEBLING'S SONS CO., Trenton, N. J.

Chapman
Automatic Signals

Charles N. Wood Co., Boston



ANACONDA
Copper Wire
111 W. Washington St., Chicago

COPPER CLAD STEEL COMPANY

ARISTOS COPPERWELD

OFFICE AND WORKS:
RANKIN, PA. BRADDOCK P. O.

WESTERN SALES REPRESENTATIVES:
STEEL SALES CORPORATION, CHICAGO, ILL.

NEW YORK SALES OFFICE: 30 CHURCH STREET, NEW YORK CITY

COPPERWELD Wire—*made by the Molten Welding Process*
Bare—Weatherproof—Strand.

LUMBER

TIES—TIMBERS—POLES—PILING
DUNCAN LUMBER COMPANY, Portland, Oregon

Specialists
In
Street
Railway
Requirements
Write for List

TROLLEY POLES—

Massey hollow reinforced concrete trolley supports made by our centrifugal process are strong, permanent, neat and adaptable.

Eliminate maintenance by ordering poles that represent the most progressive development in this field. Massey poles never need painting or repairing—and are unaffected by weather conditions or vermin.

Facts and figures gladly furnished

Massey Concrete Products Corporation
Peoples Gas Building, Chicago, Illinois

New York, 50 Church St.
Pittsburgh, Oliver Building
Atlanta, Candler Building
Dallas, Sumpter Building
St. Louis, Railway Exchange Building
Salt Lake City, 925 So. 6th Street, West

A Perfect Record of Operation

NACHOD Headway Recorders

enable the superintendent to improve service and furnish the general manager with an accurate record of operation. Easy to read and easy to file. They tell how late or early a car is according to schedule.

Easily installed with practically no added expense.

An instrument with many uses. Write for complete details.

"Nachod Spells Safety"

Nachod Signal Company, Inc.
Louisville, Ky.

AMELECTRIC PRODUCTS

BARE COPPER WIRE AND CABLE

TROLLEY WIRE

WEATHERPROOF WIRE AND CABLE

PAPER INSULATED UNDERGROUND CABLE

MAGNET WIRE

Reg. U. S. Pat. Office

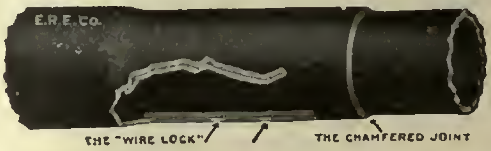
Galvanized Iron and Steel Wire and Strand

Incandescent Lamp Cord

AMERICAN ELECTRICAL WORKS
PHILLIPSDALE, R. I.

Boston, 170 Federal; Chicago, 113 W. Adams; Cincinnati, Traction Bldg.; New York, 233 B'way; San Francisco, 613 Howard; Seattle, 100 1st Ave. So.

ELRECO TUBULAR POLES



COMBINE

Lowest Cost — Lightest Weight
Least Maintenance — Greatest Adaptability

Catalog complete with engineering data sent on request.

ELECTRIC RAILWAY EQUIPMENT CO.
CINCINNATI, OHIO
New York City, 30 Church Street

FLOOD CITY

Rail Bonds and Trolley Line Specialties

Flood City Mfg. Co., Johnstown, Pa.

RWB DYNAMOTORS

FOR

CARBON ARC RAIL JOINT WELDING
CARBON ARC RAIL BONDING
CARBON and METALLIC ARC GENERAL WELDING

Rail Welding and Bonding Co., Cleveland, O.

U. S. Electric Contact Signals

for

Single-track block-signal protection
Double-track spacing and clearance signals
Protection at intersections with wyes
Proceed signals in street reconstruction work

United States Electric Signal Co.
West Newton, Mass.

AETNA INSULATION LINE MATERIAL

Third Rail Insulators, Trolley Bases, Harps and Wheels, Bronze and Malleable Iron Frogs, Crossings, Section Insulators, Section Switches.

Albert & J. M. Anderson Mfg. Co.
289-93 A Street, Boston, Mass.
Established 1877
Branches—New York, 135 B'way.
Philadelphia, 429 Real Estate Trust Bldg. Chicago, 105 So. Dearborn St. London, 171 Tottenham Court Road.

American Rail Bonds

CROWN
UNITED STATES
TWIN TERMINAL
SOLDERED
TRIPLEX

Arc Weld and Flame Weld

Send for new
Rail Bond book

American Steel & Wire Company
CHICAGO
NEW YORK

Uninterrupted Train Dispatching

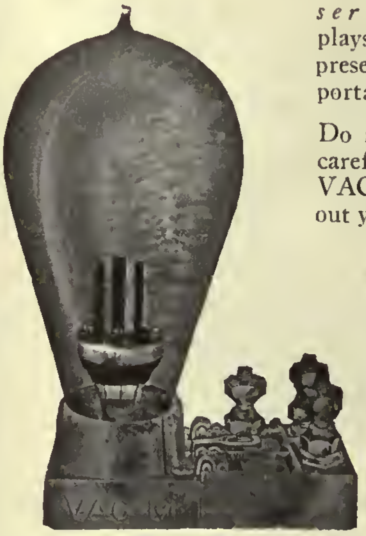
VAC-M Lightning Arresters prevent high tension disturbances from interfering with electric train dispatching, and *smooth, uninterrupted service* unquestionably plays an important part in present day railway transportation selling methods.

Do not fail, therefore, to carefully consider the VAC-M when you map out your "sales campaign."

Write for complete information.

The National
Electric
Specialty
Company

Terminal Bldg.,
Toledo, O.



"Primo Giant Type"

SPECIAL TRACKWORK

Of the well-known **WHARTON** Superior Designs *and* Constructions

STEEL CASTINGS	FORGINGS	GAS CYLINDERS
CONVERTER AND ELECTRIC	DROP, HAMMER AND PRESS	SEAMLESS STEEL

WM. WHARTON JR. & CO., Inc., Easton, Pa.
(Subsidiary of Taylor-Wharton Iron & Steel Co., High Bridge, N. J.)

ORIGINATORS OF
MANGANESE STEEL IN TRACKWORK

ERICO

ECONOMICAL
EFFICIENT

RAIL BONDS

THE ELECTRIC RAILWAY IMPROVEMENT CO.
CLEVELAND, OHIO

RAMAPO

Automatic Return Switch Stands for Passing Sidings
- Automatic Safety Switch Stands -
Manganese Construction - Tee Rail Special Work

RAMAPO IRON WORKS
HILLBURN - NEW YORK
Plants at Hillburn N.Y. and Niagara Falls N.Y. [illegible]

BARBOUR-STOCKWELL CO.
205 Broadway, Cambridgeport, Mass.
Established 1858

Manufacturers of
Special Work for Street Railways

Frogs, Crossings, Switches and Mates
Turnouts and Cross Connections
Kerwin Portable Crossovers
Balkwill Articulated Cast Manganese Crossings

ESTIMATES PROMPTLY FURNISHED

Nelsonville Filler and Stretcher Brick for T Rails

Makes permanent, light, level pavement with a minimum of paving repairs.

The Nelsonville Brick Co.
Columbus, Ohio

A REAL RAIL BOND TESTER

The Vawter New Type Direct Reading Instrument is in a Class by Itself

Send for Bulletin if you have Rail Bonds

THOMPSON-LEVERING COMPANY
PHILADELPHIA, PA., U. S. A.

The Standard of Quality

PERFECT MICANITE INSULATOR

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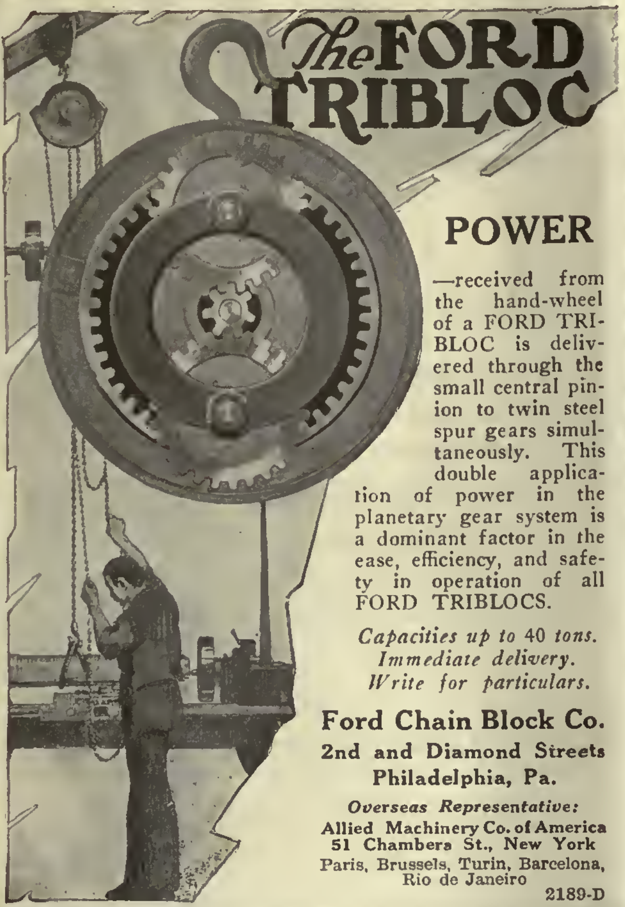

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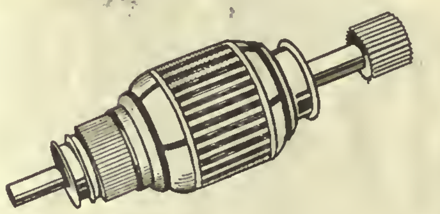

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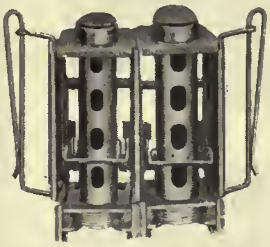

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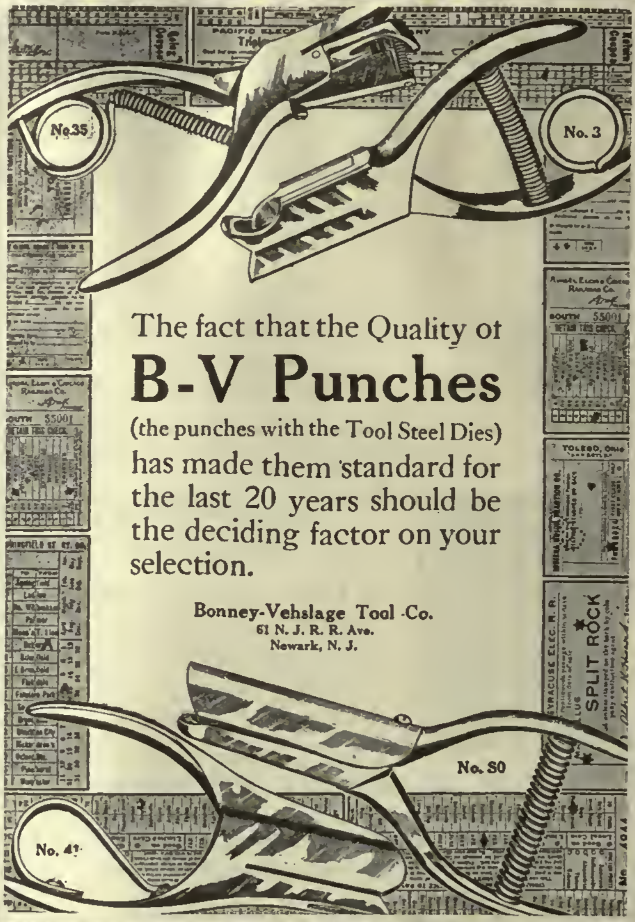

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Coach	209	Outside	8	23,947	9,821
Coach	275	Clasp	16	37,126	25,110
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General Average Mileage per Shoe				25,308	15,187

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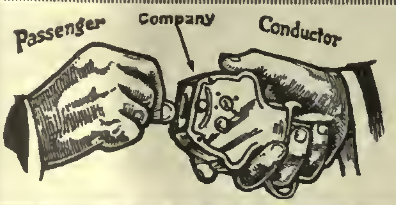

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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912

Of Electric Railway Journal, published weekly at New York, N. Y., for Oct. 1, 1921.

State of New York }
County of New York } ss.

Before me, a Notary Public, in and for the State and county aforesaid, personally appeared James H. McGraw, Jr., who, having been duly sworn according to law, deposes and says that he is the Secretary of the McGraw-Hill Co., Inc., Publishers of Electric Railway Journal, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, McGraw-Hill Co., Inc., 10th Ave. at 36th St., New York, N. Y. Editor, Henry W. Blake and Harold V. Bozell, 10th Ave. at 36th St., New York, N. Y. Managing Editor, Henry W. Norris, 10th Ave. at 36th St., New York, N. Y. Business Manager, L. W. Seeligsberg, 10th Ave. at 36th St., New York, N. Y.

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3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

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5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is (This information is required from daily publications only.)

JAMES H. McGRAW, JR.

Sworn to and subscribed before me this 20th day of September, 1921.

[Seal.] MARTIN J. WIEMER.

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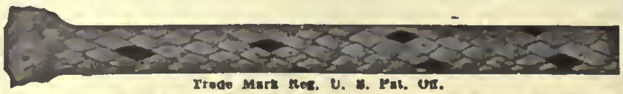

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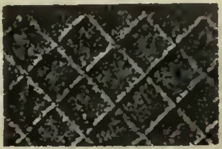

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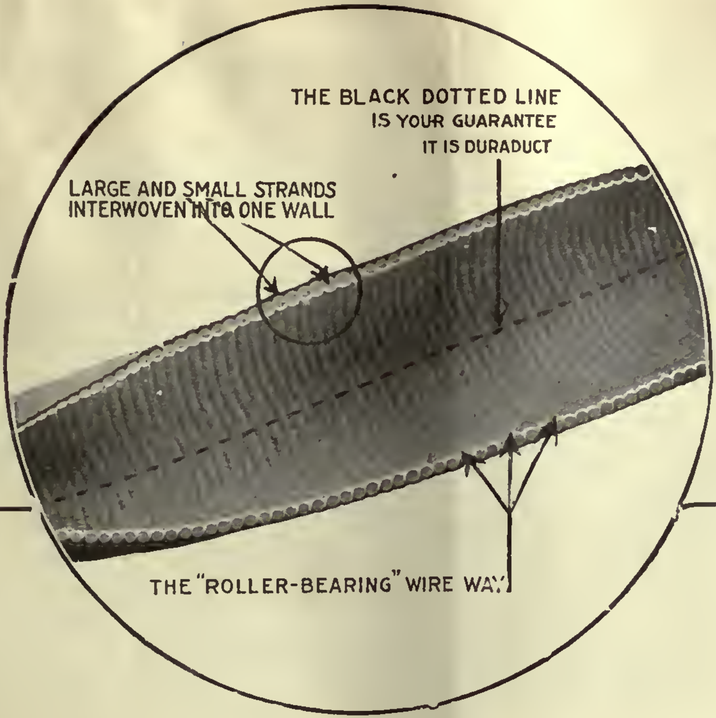

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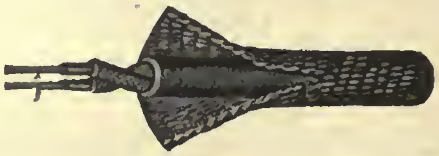

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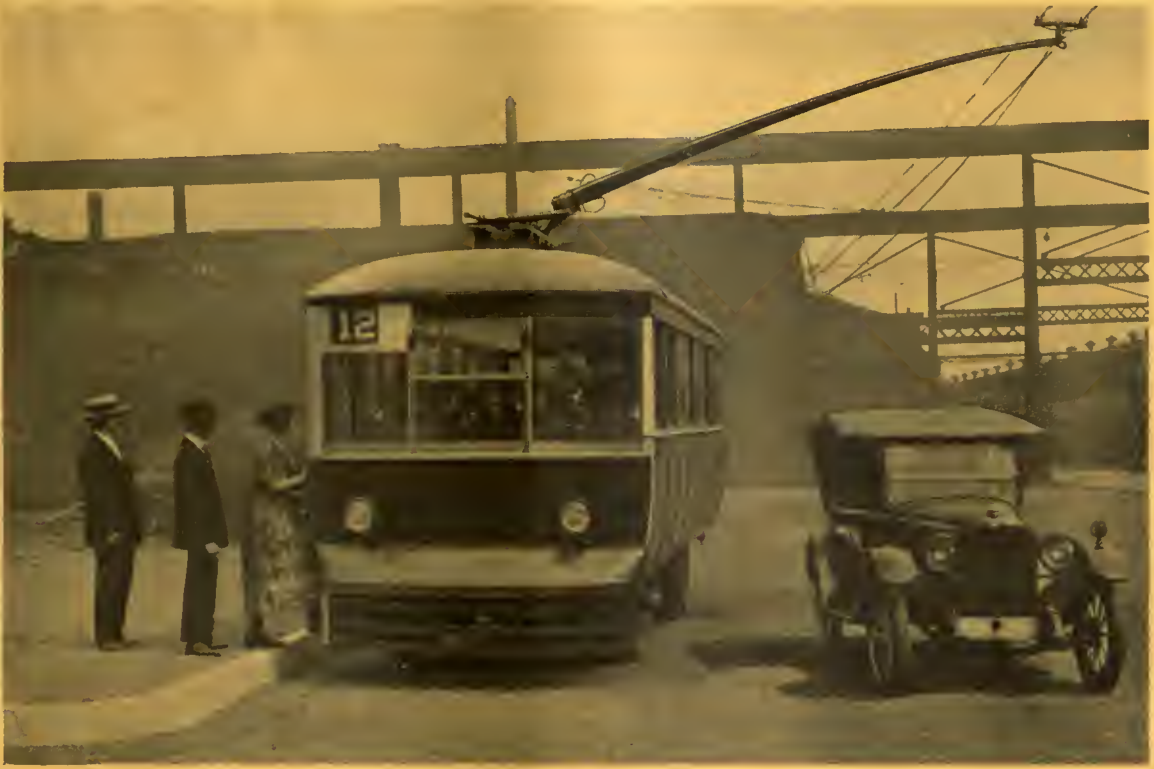

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Vol. 58, *No.* 16 New York, October 22, 1921 *Pages* 723-762

Electric Railway Journal

Henry W. Blake and Harold V. Bozell, Editors Henry H. Norris, Managing-Editor

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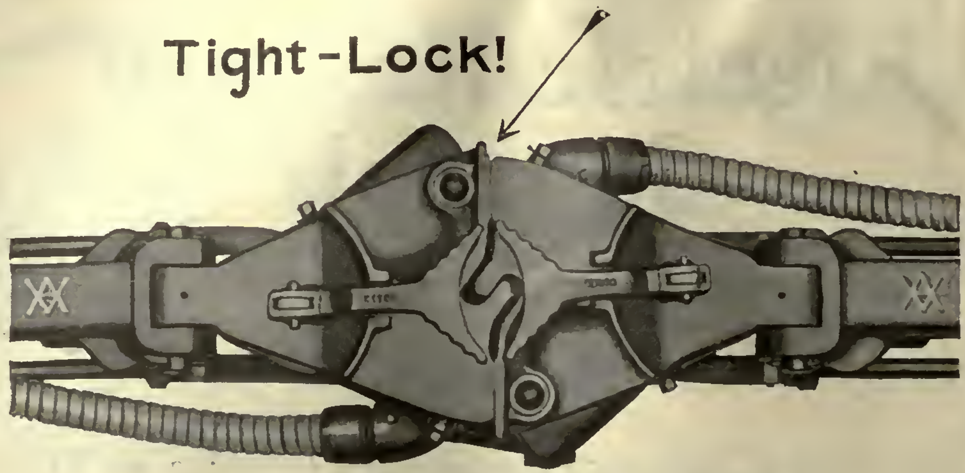

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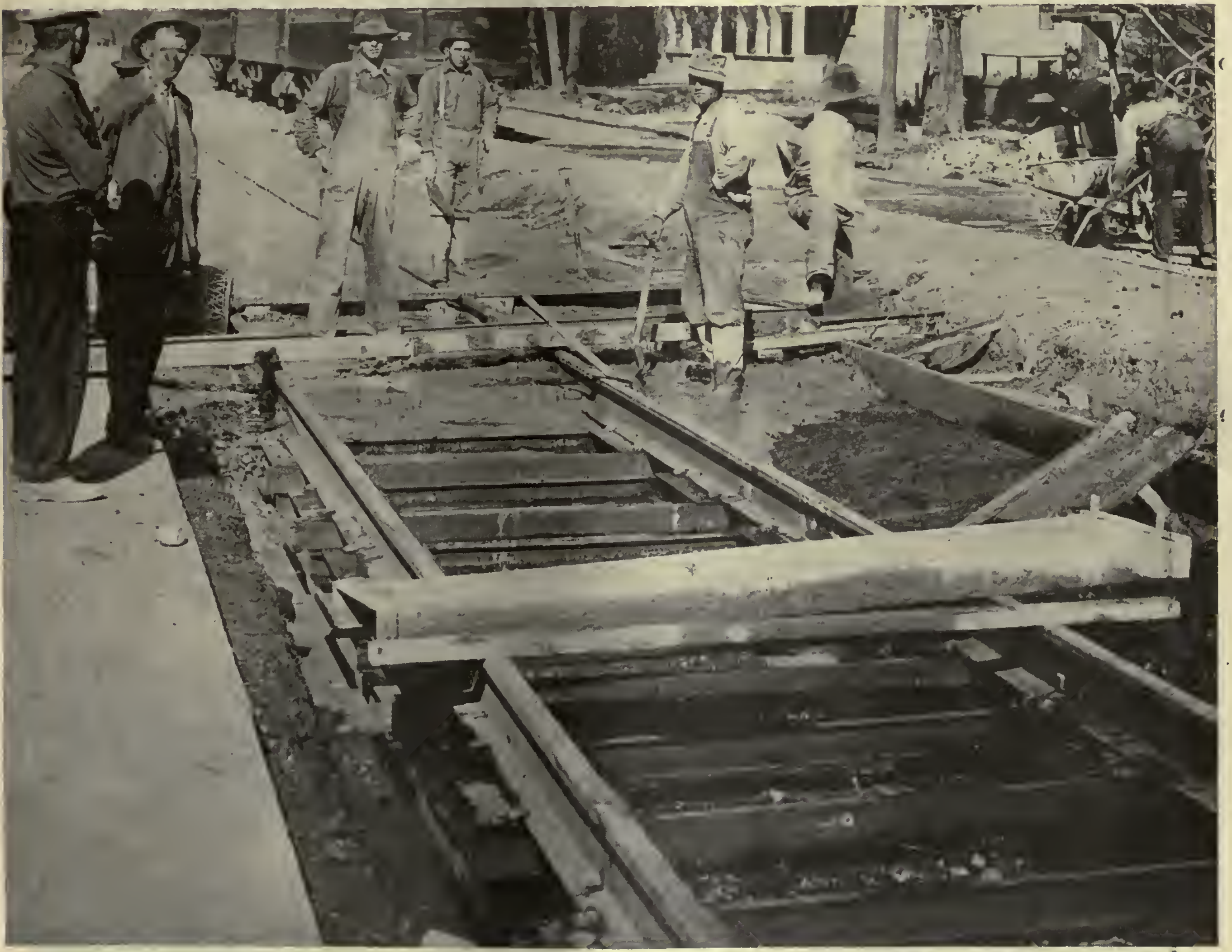

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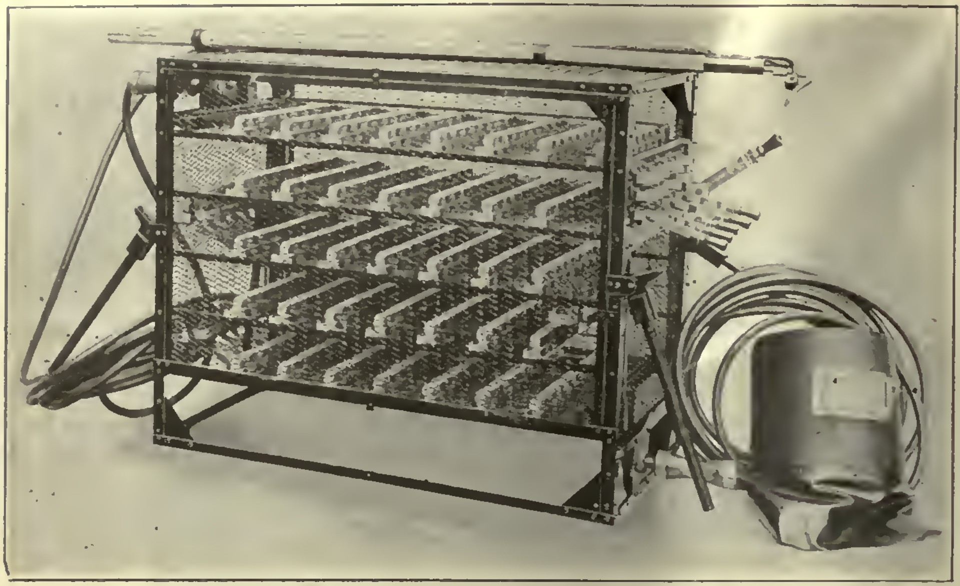

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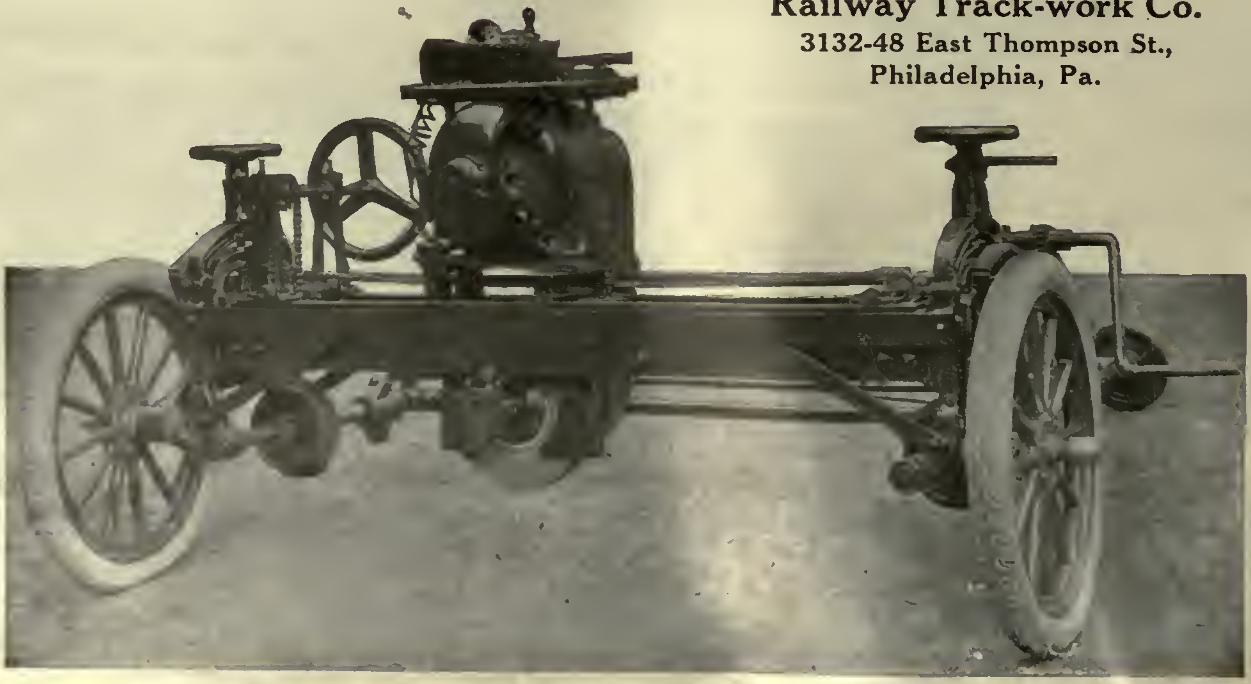

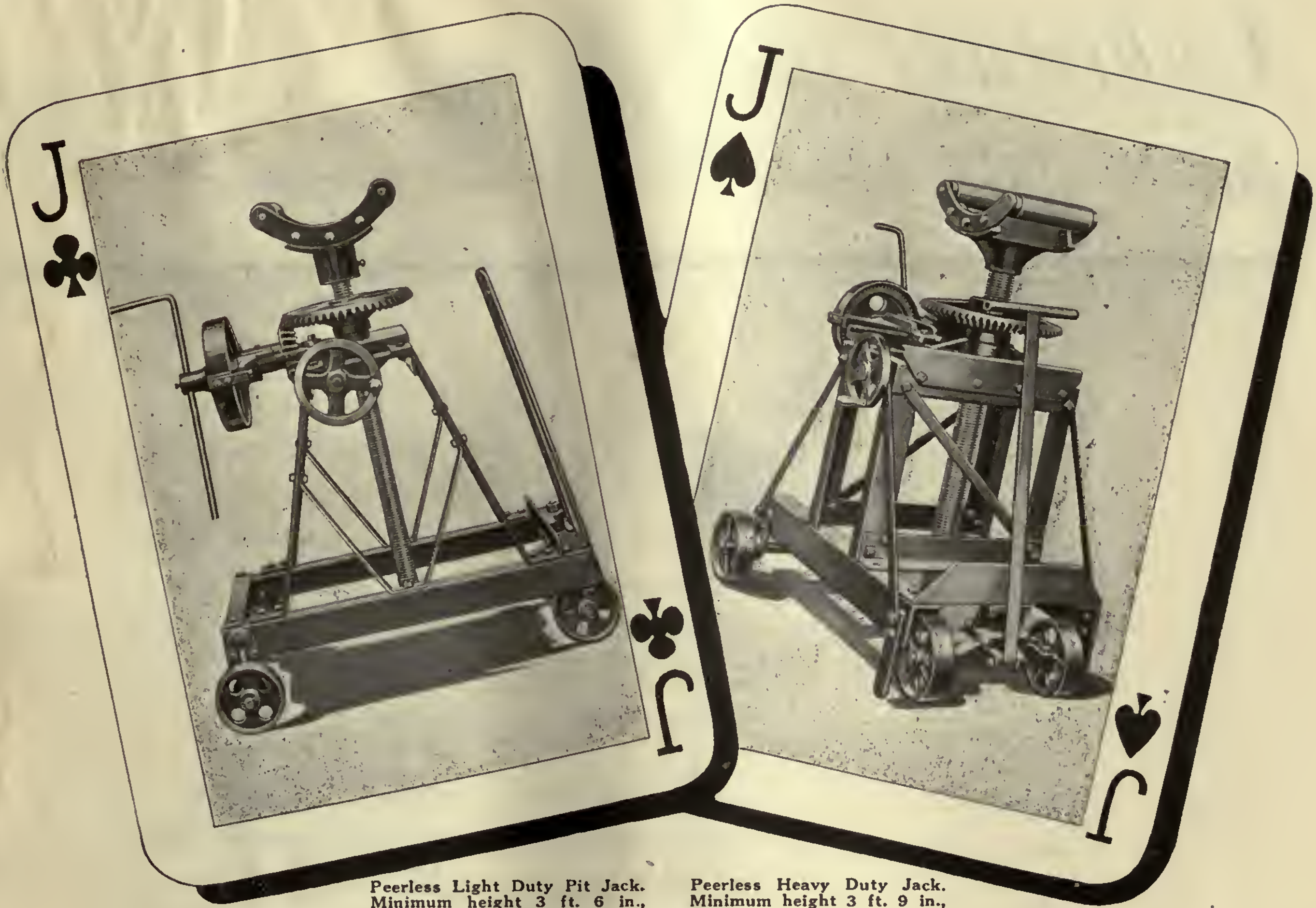

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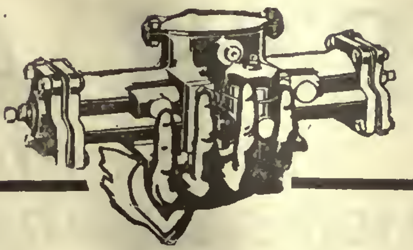

Pneumatize! *Modernize!*

Use the National Pneumatic Line to make Train Operation Fully Down to Date

Says G. M. Woods in the Sept. 10, 1921 *Electric Railway Journal:*

"The tendency in street railway practice is toward train operation for heavy traffic."

". . . .operators who heretofore have consistently favored single-car operation now feel. . . . . .train operation is the only solution of their traffic problems."

"Undoubtedly a reduction in the number of units reduces the congestion."

". . . .a two-car train will cross a street intersection just as quickly as a single unit."

Mr. Woods capably develops the argument that multiple unit train operation is the best kind and that it "rarely will be found to exceed that of train operation."

Train operation can do so much to increase track capacity that it pays to use each and every improvement that will put off the far greater costs of re-routing, street widening and tunneling; and that will give at once substantial savings in platform and accident expense with improved collection of fare.

That's why the equipment of surface car trains with better motors and control has been and is being accompanied in so many cities by that group of time-cutters known as the

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Door and Step Control
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Door and Step Operating Mechanisms
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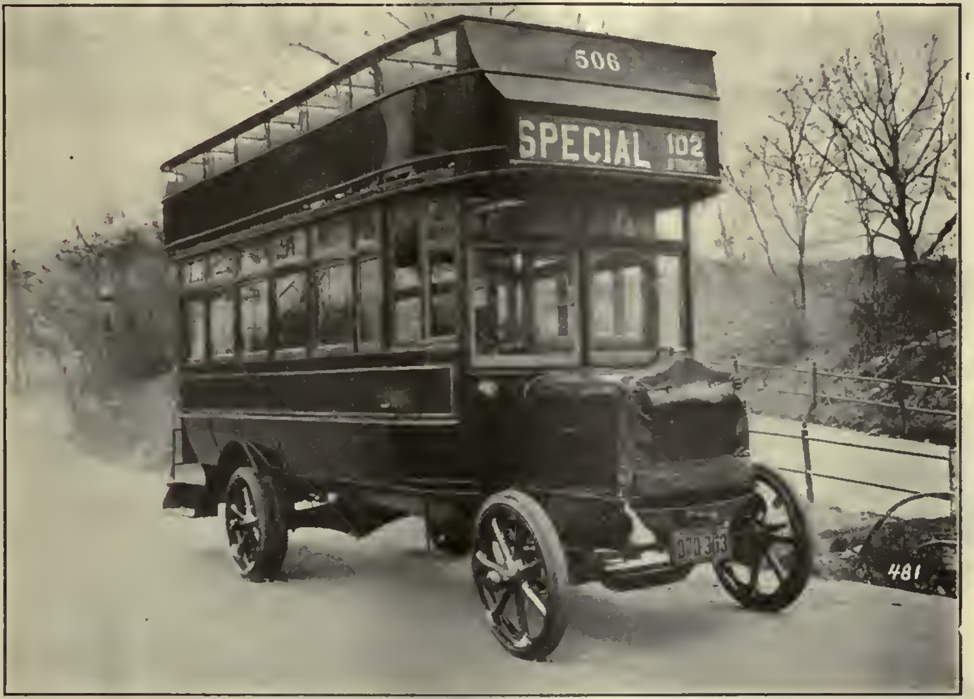
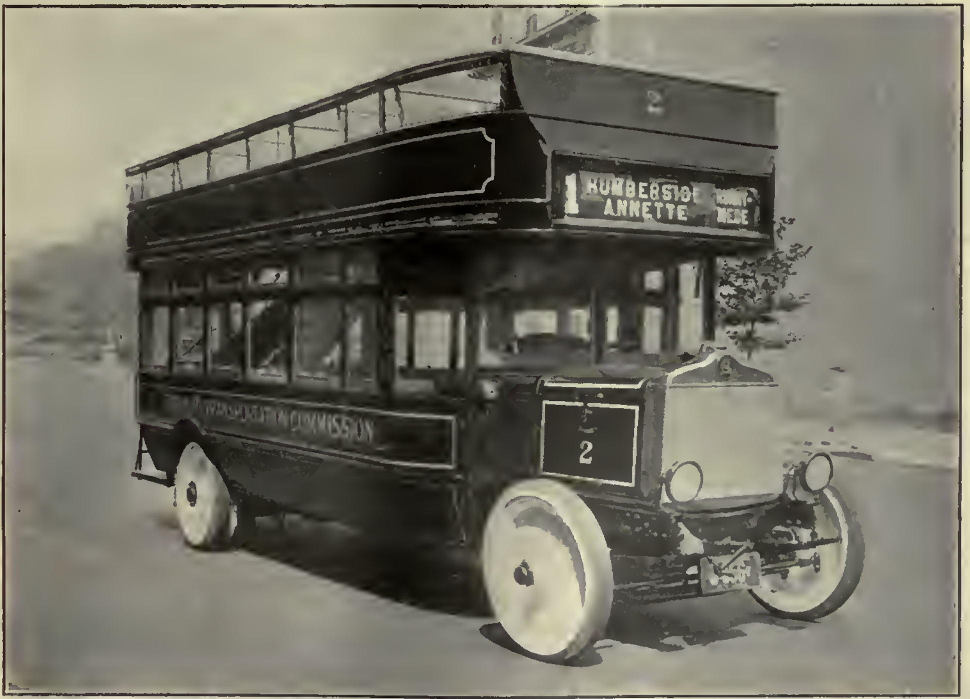
nd Standard Low Level, Double Deck, Two Men Buses



Type A—51 *Passenger*



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Let us send you complete information and proven results.

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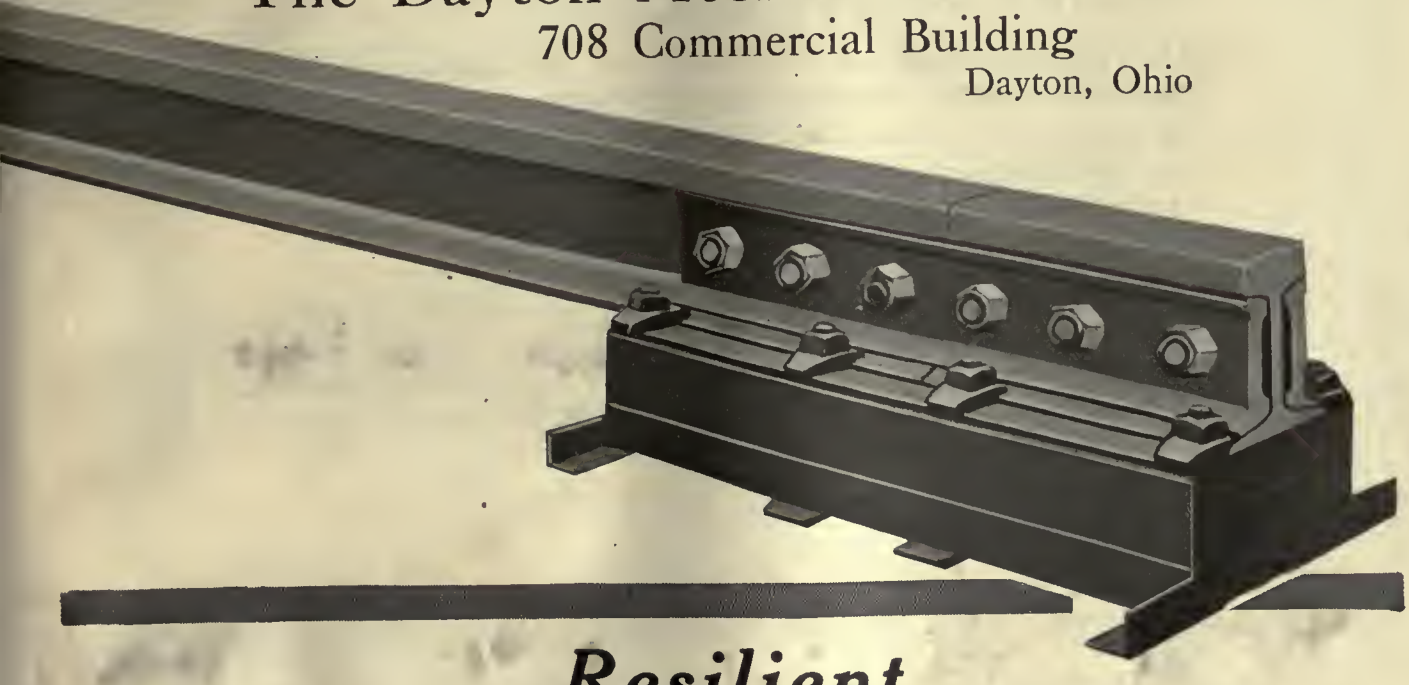

Resilient

JOINT BOOSTER

Street Railways to Prosper Says Babson

Notwithstanding the general impression that street railways have seen their best days, the industry is one of the biggest in America. In fact, it is within the group of less than a score whose sales amount to over a billion dollars a year. When you stop to realize that this billion dollars is collected in nickels and pennies, this means that the various systems carry about twenty billion passengers each year, or that every man, woman and child in the United States averages to ride about 200 times every 12 months.

Of all the large interests it is the one which pays the most to labor. Forty-six cents of every dollar goes to the employees. Furthermore, it has the smallest percentage of profit. Only two cents of the dollar goes to those who furnish the money. It is the one industry closest to the masses.

It is the common opinion that Henry Ford and other automobile manufacturers have put street railways on the rocks. In a few sections of the country this is true; taking the United States as a whole it is not true. There are more street railway riders today than ever before. Statistics show that there is even more riding per capita today than there ever has been.

The difficulties of the street railways have come during the past few years from the increase in the cost of labor, material and operating expenses in general. Now that these expenses have turned the corner and are going downward, the street railway industry will automatically become more prosperous. This means just one thing—street railway bonds as a class will go up in price.

From paper read by Roger W. Babson
before recent A. E. R. A. Convention.

ELECTRIC RAILWAY JOURNAL, 10th Ave. at 36th St., New York, N. Y.

The Guarantee Contract

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The guarantee contract is a challenge to quality;
it determines the difference between
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- and offices in principal cities -

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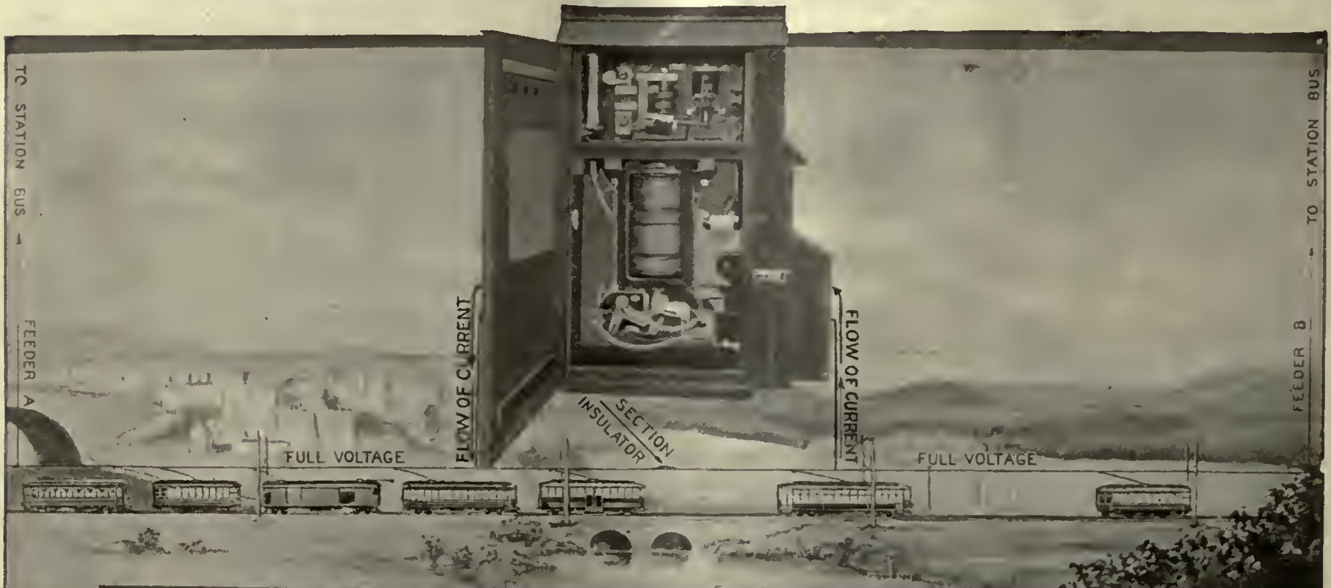

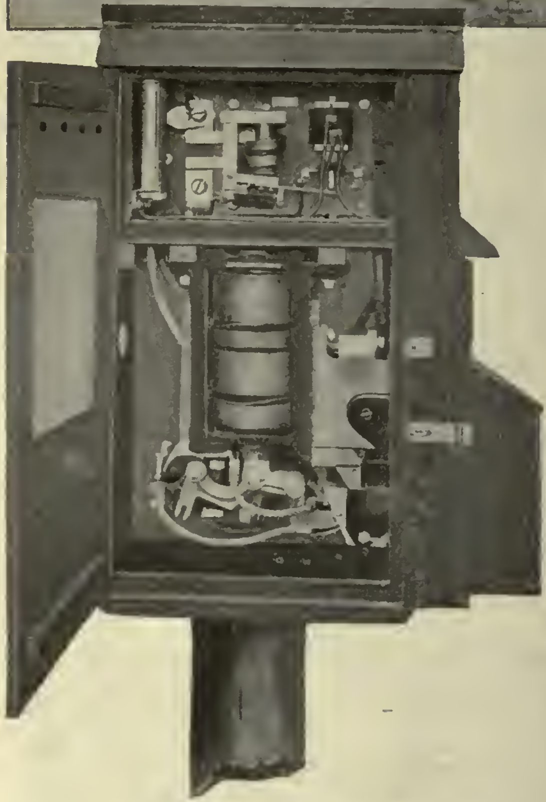

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Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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Volume 58 New York, Saturday, October 22, 1921 *Number* 17

One-Man Operation of Present Equipment Justified

ONE-MAN operation of street cars has been most successfully introduced heretofore where the change was accompanied by the installation of new cars of the safety type, a shortening of the headway between cars and in many cases a faster schedule speed. This plan gave the patrons better service in safer cars at the same time that it provided reduced operating expenses for the company. When conditions are such that this plan can be followed out it is undoubtedly the best course to pursue.

But under the condition of materially less riding which now prevails in many cities it is often a justifiable procedure to change over present equipment for one-man operation without giving more service and simply in the interest of self-preservation on the part of the company. This drastic economy measure is applicable particularly in the smaller cities. Even where there is an exacting rush-hour traffic, with fairly light traffic the remainder of the day, the judicious use of street collectors during the heavy periods will enable one-man operation to be installed successfully with large savings. Some companies are boldly coping with the present situation by replacing two men with one on single- and double-truck cars and thus obtaining the principal saving that can be derived from standard safety cars without waiting until new cars of that type can be financed. In some cases safety devices are installed to compensate in safety for the absence of the second man.

The Cleveland Railway has been operating forty double-truck cars with one man since June 1. The Eastern Massachusetts Street Railway is operating 426 double-truck cars with one man in addition to 251 standard safety cars. In Spokane, Wash., the Washington Water Power Company and the Spokane Electric Railway & Power Company are both operating all cars with one man. In Seattle, Wash., twenty-seven double-truck cars seating sixty people are being successfully operated with one man, as noted in this paper on page 940, May 21, 1921. The Tri-City Railway & Light Company is well along with its plan to operate all cars in Davenport, Rock Island and Moline with one man, as related elsewhere in this issue, and the same management is operating all cars with one man in Muscatine, Cedar Rapids and Mason City, Iowa. In other words, this practice has been successfully established in a number of places.

With gross revenue substantially lower than last year and with a further fare increase now usually untimely and undesirable for several reasons, companies should put into effect such measures as will keep operating costs well below the income, even though this may mean some radical departures from former practices. About the biggest saving that can be made is the elimination of one man on a car. There are many cities with population of less than 100,000 where it appears quite evident that this can be done, and should be done in view of the exigencies of the time, rather than to go on accumulating a deficit. Furthermore, there are many lines in cities of over 100,000 population on which the cars could be satisfactorily operated with but one man. Incidentally, if such one-man operation of present equipment makes possible a reduction of fare later on, this should be welcomed, particularly where the competitive situation is a matter of concern.

Broad Vision and Statesmanship Needed in Labor Readjustment

THE readjustment with labor in the railroad field is of such nationwide importance, is on such a huge scale, that it attracts the attention of the entire country. It emphasizes dramatically the necessity for real vision and statesmanship in dealing with the most important subject before the nation today—the economic and social readjustment, which cannot be evaded. And this much is certain, that the balance which will finally obtain will not and should not be the *status quo ante*, the mere return to conditions of 1913, good as they may have been. Actual progress must result, and this is the reason, above all, that real statesmanship is needed.

In the electric railway field the problem is as great and as serious as in any other. While the entire industry does not meet the problem as of one date nor as an entity, nevertheless the individual readjustments, each with its own local variations, have a vital effect on the entire labor situation. There is the same opportunity and necessity for leadership and vision in the labor problems of this industry as elsewhere. Will the industry measure up to the hour? Will it produce the leaders who will look to future conditions rather than past policies? There is reason to believe so. While at times there are signs of shortsightedness, there are also instances of the opposite nature.

One of the leading executives in this industry, an officer of a large holding and managing company, was recently approached by one of his local managers with his labor readjustment problems. "Now is the time," the latter said, "when labor is plenty, for us to break up the combination against us, to squeeze back as we were squeezed on our last agreement. The men have to take what we will give." "No," said his broad-minded superior, "now is the time, rather, for us to show that we deserve to be managers by showing a better vision ahead. Now is the time, when opportunity exists, to go to the men and improve our working rules, to place our relations with the men on a higher plane. They are willing to talk now, let's do something constructive; not something which will merely be an invitation to further radical action by the men if the tables turn again."

The local manager was converted to a trial of the broad policy. He went home and tried it. It worked. He wrote his superior that, by approaching the men in a constructive attitude, he had been able to make many improvements in working rules, make many changes in operating conditions, make a satisfactory reduction in wages, and still leave the men with their self-respect and, more important, with their respect for, and loyalty to, the management much strengthened.

It is this sort of leadership and vision, in dealing with labor, that is needed.

The Labor Situation and Coal

BUT even when management does seem to show the right attitude, it cannot always be assumed that labor will do so. An example seems to exist now in the coal industry which should make coal users sit up and take notice, as well as those who are interested in the general subject of labor relations.

No one minimizes the unfortunate effects of the seasonal occupation of the average coal miner. But individually, his rate is high. His working conditions are the subject of much debate. But he has apparently refused to arbitrate his condition when his present contract expires the first of next April. The quite possible result is a coal strike next spring, now freely predicted and more probable than a railroad strike.

Management, in this case, seemed at first uncompromising, but finally agreed to arbitrate. The miners, by their recent action, hold that the strike is their only weapon and refuse to arbitrate. The public feels that coal is high and will be impatient, but yet rather powerless, in case of a strike.

Meanwhile, industry is affected in unpleasant anticipation. An immediate remedy is to lay in large coal stocks. It seems wisdom to do this and certainly railways and other utilities will do much to maintain community life if they can assure the community of no cessation of activity on account of coal shortage. A few months stock of coal is good business just now.

Let Us Have More Material Specifications

THE practice of purchasing railway materials and supplies on accurate and practical specifications is becoming more and more extensive. The standing committees of the American Electric Railway Engineering Association presented at the recent convention a number of such specifications which were approved. Every encouragement should be given to the committees to prepare and increase the number of such specifications which can be adopted as standard.

One way that railways can reduce costs is by using better material for making repairs. It costs no more to apply good material than poor, and when the latter fails in service additional material must be purchased, and the labor cost of one application and removal is lost. This adds to the maintenance cost and, in addition, the increased number of failures and delays in service will cost the company much in the loss of good will from its patrons.

Another advantage arising from the use of specifications is that railway companies are enabled to go into the open market for material and thus profit by trade competition and also have a greater variety from which to select. Manufacturers in general prefer to furnish material to intelligently drawn specifications, as they know in advance exactly what requirements are expected and can supply materials that will prove satisfactory. During the war it was frequently necessary to use inferior materials in order to keep equipment running, but now this practice should be discontinued.

To obtain the minimum maintenance cost consistent with safe, clean and reliable service requires close following of every detail that goes into the equipment. Whether or not material is standing up in service and producing the desired results can be best determined by a periodical checking of the amount ordered, the amount on hand and the amount used. It always pays in the end to purchase durable material, owing to the reduced maintenance and operating costs. No matter how cheap the first cost may be, any material requiring frequent repair, patching or renewal is expensive.

Self-Preservation Is the First Law of Nature

THE natural instinct for existence is the reason that citizens in a number of communities are organizing to supply volunteers if necessary to help operate the railroads after Oct. 30. The proposed strike of the railroad employees threatens the stoppage of a necessity of our civilized life. The spirit behind the offer of services to keep the railroads in operation is accompanied by no desire, in most cases, to pass upon the merits of the controversy over wages. The answer would undoubtedly be the same if the owners of the roads withdrew their equipment because they considered their remuneration unsatisfactory.

The organization of the community at large to act in labor troubles of this kind is the natural result of the size of existing labor unions. Formerly the largest strike on a railroad or a coal mine or other public utility involved an isolated property or a single community only. Then the rights of the public were preserved, if order was maintained, because men could be brought from outside to do the work. But many of the present unions are so large that a strike threatens a national stoppage of work, and they can be opposed only by an equally widespread organization of citizens.

Time lends perspective to the view—even to the labor view—and the belligerency so much in evidence now may subside with the passing of a few days and with a growing appreciation of such ideas as are expressed above. It is hoped that the present strike will not occur, but if it does the result will undoubtedly be a failure, as with the railroad strike and the coal strike in England.

Electric Railways Ready in Railroad Emergency

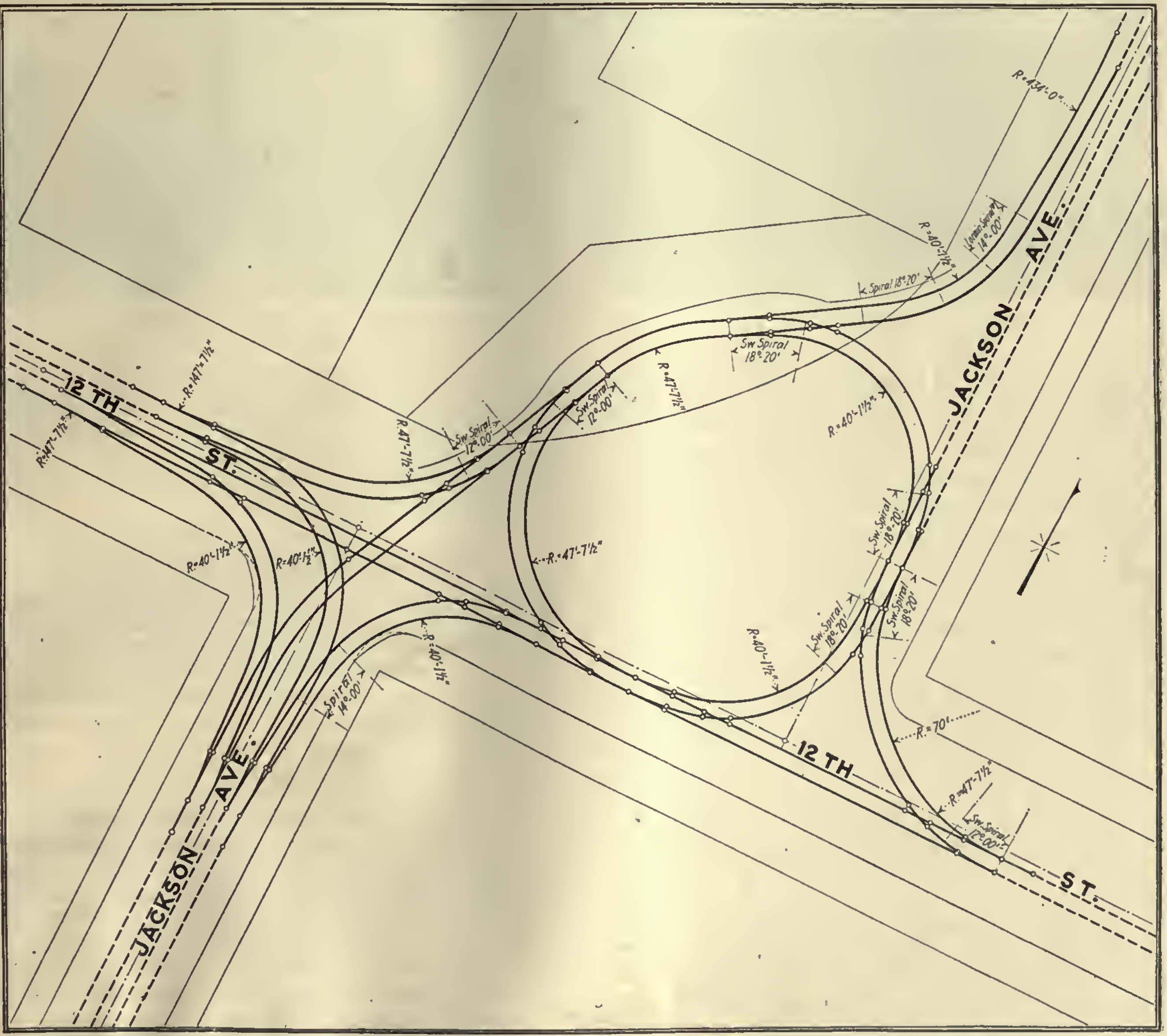
OF ALL the agencies that will be called into play in the emergency of a strike, the electric railways hold out large prospects for being converted into an important agency in helping to meet the contingency that a cessation of activities on the railroads would create. Particularly is this true in the Central West. Already inquiries are beginning to be made of this paper as to the extent and location of the electric railways. All these data are on file with the authorities in Washington, for whose benefit they were carefully noted during the war-time period through the foresight and planning of the American Electric Railway Association. It is sincerely to be hoped that the steam railroad labor leaders will see the error of their ways in time, but in the emergency of a strike the electric railways offer a means quickly available of handling both passengers and freight to an extent perhaps little realized except by official circles in Washington and by the regular users of such lines.

Universal Loop for 118 Cars an Hour

Extensive Special Work Layout Installed on the Kansas City Railways to Facilitate Operation of Cars on New Routing Plan and Avoid Congestion and Likelihood of Accidents Which Were Involved in the Old Layout

CONDITIONS from an operating standpoint have been rather congested at the corner of Jackson Avenue and Twelfth Street, Kansas City, Mo., for some time back. At this point, the Jackson Avenue crosstown line of the Kansas City Railways intersects with the Twelfth Street line, which terminates at this point. The intersection of these two lines has heretofore involved a fairly complicated layout of special work on account of a jog in Jackson Avenue and the facilities necessary for wying the Twelfth Street cars, which carry the heaviest traffic and run on the closest headway of any line on the system. Extending east from Jackson Avenue, a single-track line on Twelfth Street has been operated with double-end cars, which have been turned back at this point.

The installation of the rerouting plan devised by John A. Beeler was seen to involve further complications at this point, from the standpoint of track facilities. This plan provided for the through routing of the crosstown line on Jackson Avenue south of Twelfth Street with the Roanoke line, which is routed east over Twelfth Street from this intersection. In order to operate this through route, it was neccessary to have a double curve in the northwest quadrant of Twelfth Street and Jackson Avenue. The new routing plan also provided for making Twelfth Street the southern terminus of the Hardesty-Jackson line except during rush hours. A further complication was brought into the problem by the desirability of operating single-end cars instead of double-end cars on Twelfth Street east of Jackson, which would then have to be wyed at this point. It was also necessary to maintain track connections at this intersection to enable cars housed at the Brighton carhouse to pass through and take up their routes.



New Universal Loop at Important Terminus and Intersection Point, Recently Installed in Kansas City

While the layout of the old special work was such that most of these movements could be made, it was evident that with three lines terminating here and with the wying back of single-end cars, there would undoubtedly develop very considerable congestion and liability of accident to both the company's equipment and vehicular traffic. The problem would only partly be solved by putting in the double curves from Twelfth Street on to Jackson Avenue south, and there was not sufficient room in these street intersections for putting in a proper loop. The study made of the situation finally developed that the best solution was the installation of a universal loop so connected as readily to serve all lines.

In order to build this universal loop it was necessary to lease 5,930 sq.ft. of property adjoining in the northwest quadrant. Fortunately, the lease of this property appeared to the owners to be an advantage, inasmuch as it increased their frontage considerably and permitted them to build shops facing a heavy transfer and terminal point. The new layout of track was such that it was practically impossible to use any of the old track to advantage, although it was in good condition. It was therefore salvaged and an entire new layout purchased from the Lorain Steel Company.

Double Tracks and Universal Loop as Seen Looking South in Jackson Avenue

It was quite a problem to install the new track. The layout was such, and the service at this point of such character, that it was found impossible to install all of the work under traffic. Such parts as were not complicated by continuous service were therefore put down before the final installation, which was arranged to be done in a single night. This required the employment of a gang of more than 100 men. Service was cut off at 9 p.m. and the owl car used the loop at 3:30 a.m. A. E. Harvey, chief engineer, writes that "The work went together without trouble of any kind; there was not ⅛ in. variation to be taken up in any part of the work, so perfect were the computations, the manufacture and the staking out of the new alignment, which is somewhat remarkable, taking into consideration the size and character of the layout and the fact that various pieces of it were installed before the final connections were made."

The track in the layout is built of 7-in. T-rail, Lorain section 375, Trilby rail section 467, and the guard section 468. The switches, mates and frogs are of cast bound construction. The track was laid with wood ties on ballast and thoroughly tamped. Various types of paving were used to conform to the paving of the adjacent streets. Six of the thirteen switches were equipped for electrical operation.

The large expenditure involved for trackage at this point is justified by the fact that it is an important intersection and transfer point where there would undoubtedly exist a great deal of congestion unless cars could always be moved in a forward direction. The new layout makes this provision for all lines entering the location, and the importance of this location from a traffic standpoint will undoubtedly increase from year to year. The maximum number of cars using this loop is now 118 per hour.

While it would be very difficult to arrive at an estimate of the actual operating saving effected by the installation of these extensive loop facilities, the company officials are satisfied that it is considerable, on account of avoiding the delays that would occur not only through the normal operation of cars of the various lines throughout the day but the delay that would occur in putting cars from the Brighton carhouse which have to pass through this important intersection en route to five lines were proper connections not available. To carry out the larger rerouting scheme, which meant a very material saving, it appeared necessary to provide all the track connections installed with this loop, and careful investigation developed no other combination that would answer all purposes.

Universal Loop and Connections as Seen Looking West in Twelfth Street

Electrolysis Report Nearly Ready

DURING the past month the final editing work on the report of the American Committee on Electrolysis has been completed and the report placed in the hands of a printer. This work will bring up to date the conclusions and recommendations that have been agreed upon as a result of a joint study of the electrolysis problem by the Bureau of Standards and the utility interests represented on the American Committee on Electrolysis.

During the month also the final experimental field trials of the earth current meter have been completed, and the completion of these field trials has definitely established the utility of this instrument for practical electrolysis survey work. A description of the principle of the method and apparatus has been prepared for early publication and plans are now being made to use several of these instruments in connection with the co-operative work of the bureau and the research subcommittee of the American Committee on Electrolysis.

One-Man Operation Saves $110,000

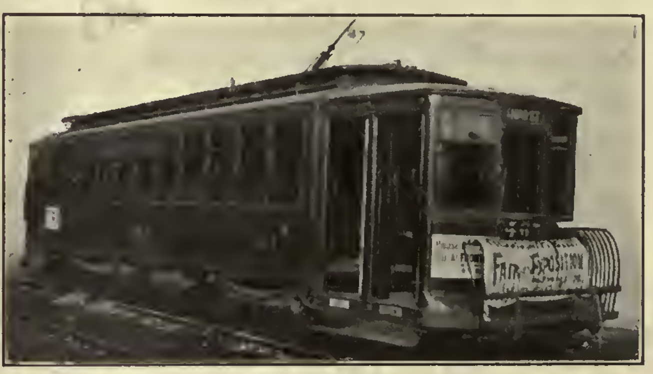
All Cars in Davenport, Iowa, Now Operated with One Man—Experience in Several Iowa Cities Confirms Practicability of Using But One Man with Large Cars—Separate Entrance and Exit Provided

ON JUNE 1, 1921, the Tri-City Railway of Iowa, Davenport, Iowa, began one-man operation of its cars, reduced wages from a maximum of 70 cents an hour to 50 cents, with 5 cents additional for one-man operation, and voluntarily reduced the rate of fare from 9 cents cash, with three tickets for 25 cents, to 8 cents flat. By Aug. 6 all cars had been rearranged and were being operated with one man on the same schedule that had been in effect with two-man operation. The reduction in fare was virtually a trade with the public for one-man operation, though from the standpoint of net earnings the reduction was not justified. The company is looking to the future when business improves to derive the real benefits of the reduction in platform expense. At present the saving figures out to be about $4,500 a month net.

The company operates 20,400 car-hours a month. Reducing the platform cost by 45 cents an hour means a monthly saving of $9,180 and an annual saving of $110,160. The reduction in fare was not of a nature to have any appreciable effect in stimulating riding, so that it entailed a loss in revenue of approximately $4,500 a month, leaving a net improvement of some $4,600 a month in the net earnings. Of course, because of the time required to prepare the cars for one-man operation, the reduction in fare with only partial one-man operation in June and July actually produced a loss. The saving in operating expenses in June was $1,800 and in July $4,000. August and succeeding months will produce the full saving of over $9,000.

This drastic change of all of the two-man, forty-four-seat, double-truck cars in Davenport to one-man operation was preceded by experience in Mason City, Muscatine and Cedar Rapids, Iowa, where the local street railways are operated by the same interests, the United Light & Railways. All cars in these cities have been operated with one man for some time past. Standard safety cars are being used entirely at Mason City except for the single-truck old type cars used for extras, and some safety cars are used at Muscatine. Half the cars in Cedar Rapids are of the safety type and the remainder are double-truck cars operated with one man without any safety equipment. These include ten double-truck cars weighing 26,500 lb., seating forty people and equipped with 24-in. wheels, and four cars which weigh 40,000 lb. and seat forty-four passengers. B. J. Denman, president Tri-City Railway, stated that "Our Cedar Rapids officials and men prefer the large cars to the small ones, and so do the public."

While the company was satisfied that the cars could be operated with one man in Davenport, it was prevented from doing so by the Socialist City Council, which based its position on an ordinance prohibiting one-man operation that has been on the statutes some thirty years. Affidavits were secured from companies throughout the country to show what other cities think of one-man operation of street cars, and a temporary injunction was secured against the enforcement of this ordinance. The main contention of the city was that the cars were unsafe when operated with one man, and the local company agreed to equip the cars with safety devices. The safety devices installed on the cars are of a special design developed by John Sutherland, master mechanic, and comprise a scheme for doing electrically practically what is normally done by air in the standard safety devices. The details of this equipment and its functioning are not yet available, but are expected to be made public in the near future. The average cost of equipping the first twelve cars for one-man operation was $315.98 for labor and $283.49 for material, making a total of $599.47. The cost ran as low as $459.36 and as high as $635.90. It included the cutting of a new door in the vestibule at each end of the car, putting in a new post between doors, dividing rails to separate the entrance and exit passage ways, new air-operated hinged doors, and, in some cases, the trussing of platforms and other rehabilitation work in the vestibule structure. The new exit door for one-man operation was cut in the vestibule just behind the former front exit door, which now serves as the one-man entrance. Both door openings are 29½ in. wide. These cars weigh 40,000 lb., are 44 ft. 8 in. long and seat forty-four passengers. The bridge cars operating from Davenport to Rock Island are of the same capacity and dimensions but weigh 30,000 lb. These cars are now one-man operated, but the extra door was not cut in.



TYPE OF CAR AND ARRANGEMENT OF DOORS FOR ONE-MAN OPERATION

TRAFFIC IS LIGHT AND WITHOUT BAD PEAKS

To give an idea of the traffic handled in Davenport, it should be said that the base schedule calls for thirty-seven cars on seven lines. The headway on all lines is fifteen minutes except one, on which it is ten minutes. This schedule remains the same all day throughout the eighteen hours, since there is practically no rush-hour of any consequence to be handled. The average schedule speed in May was 8.77 m.p.h. for the entire system and for June 8.64. This same speed has been maintained with the one-man cars, which have been uniformly on time except for delays at railroad crossings, etc., and there have been no more cars late than there were when operated with two men.

The absence of any particular rush-hour period is partially due to the very great falling off in the number of passengers to be handled, due to the almost complete shut-down of the industry of the city, 92 per cent of which is devoted to agricultural implement manufacture. In 1919 the Davenport company carried 15,000,000 passengers, while in 1920 it carried 13,000,000, and this year is going on the basis of approximately 10,000,000. In May, 1920, the number of passengers carried was 1,168,878, which is compared with 782,251 in May, 1921. In June last year the number of passengers was 1,118,758, as against 746,925 this year. The number of revenue passengers per car-mile was 4.4 in June, 1921. The fourteen extra cars which are run from the Rock Island arsenal to various points in the tri-cities each evening are also being operated with one man, the total traffic to be handled from here now being about 700 employees. Altogether, fifty-three cars were changed over for one-man operation.

CONDUCTORS USED AT START

For the first three days on each line, after the cars were rearranged, a conductor was placed in the front end to collect fares. The operators thereafter were a little slow at first, but soon became familiar with the equipment and their duties in collecting fares. The reaction of the public to the new plan of operation was practically nil and there was no newspaper comment one way or the other except for the discussion of one Socialist paper, which talked about the cars as "death traps." There has been some feeling in Davenport against the standard one-man safety car, as it has been talked that it would be a step backward, but absolutely no objection has been raised on the part of the public to the operation of the present car equipment with one man.

The change to one-man operation was of course an economy measure, made particularly urgent by the falling off in traffic. In speaking of deriving the advantage of one-man operation but utilizing present equipment, Mr. Denman made this significant statement:

"I would not ask an investor to put money in a railway property for new equipment under present conditions, when the largest saving due to the use of one-man cars could be obtained by the use of the present equipment, and especially when there is absolutely no question that there will be a very substantial reduction in the price of small cars in a year or two. Even if we desire to put smaller cars in service at some future time, the present equipment would be extremely useful on the heavier lines and for use during the peak hours."

Work has been started to change over the sixty-six cars in Rock Island, Moline and East Moline, Ill., for one-man operation. The base schedule in these cities calls for thirty-eight cars, and as soon as the necessary changes in equipment can be made, one-man operation will be started and the 9-cent fare, with 8½-cent tickets, reduced to 8 cents flat. A little later then, all of the cars on the Tri-City properties will be one-man operated.

The American Engineering Council has just made public a report on eye accidents that have occurred in various industries. The protective methods as applied in various plants have effected a great reduction in injuries. The report stresses the importance of correcting subnormal vision among employees, stating that excess eye fatigue results in conditions which must produce a time labor loss from the reduction in quantity and quality of the work produced. The importance of proper lighting is also dealt with.

The Human Side of Energy Saving

Experiences and Observations in Winning the Support of the Trainmen and the Results Obtained on an Interurban System

BY R. E. LUELLEN
Safety Engineer, Union Traction Company of Indiana, Anderson, Ind.

WHEN the general manager called me into his office one day eighteen months ago and said, "Ross, we've decided to buy kilowatt-hour meters for installation on 105 of our interurban cars; how would you like to take charge of our power-saving efforts?" I did not at once answer. I was a claims and safety man, if anything, in the electric railway business. Could I succeed as a power-saving man? Could we actually save power under our operating conditions? Would a man who had never operated a car or even worked a day as an operating man be able to instruct skilled trainmen in better methods of operation? I doubted. But I had faith that the boss would not be asking me to attempt something that seemed impossible of attainment; so my affirmative answer was finally given. Then my experiences in a new phase of electric railway operation began. Installation of the meters was started on March 11, 1920, under the direction of an engineer from the manufacturers.

STARTING THE CAMPAIGN

The dials of the meters were masked as the meters were installed and these masks were not removed until we were ready to begin use of the meters. This was done to ascertain the amount of power normally consumed by the cars.

During the installation we prepared a booklet for the trainmen, dealing with proper methods of economical car operation. Cards were also developed, on which the motormen could record and report the meter readings and train movements, as well as record forms for use in the office.

Beginning on May 6, a series of meetings with the trainmen was held at which the purpose and use of the meters and manner of making reports were explained to them. At these meetings the instruction matter in the booklets was elaborated verbally. I was beginning to see the light by the time these meetings were held and was able, therefore, to inject some little enthusiasm into my discourse on economical operation.

Following these meetings, on May 10, the masks were removed from the meter dials and the motormen began reporting meter readings and experimenting with various sorts of operation, taking keen interest not always prompted by belief. After a few days' trial, I felt that most of them came to a uniform conclusion, which is summed up in the following literal quotation: "Maybe it can be done on some runs, but it can't be done on mine."

We found, as time went on, that the really big part of this work is that of inducing the motormen to disabuse their minds of the belief that on *their* run there is little or no chance to coast or otherwise to save power. However, a considerable number of men, principally those in service only a few years, maintained a permanent interest and belief which could not be ignored by the disbelievers, and as months passed a constantly increasing number of the men came to appreciate the worth of the efforts and to practice better operation in varying degrees.

To overcome the very human tendency of the motormen to lose interest in this work various means have been resorted to in co-operation with C. S. Keever, our superintendent of transportation. In addition to the periodical statements of showings of the motormen, which are posted in the trainmen's rooms, matter has been published each month in our employees' magazine, *Safety*, calculated to build and keep up interest and belief. The condition of equipment, we have learned, has a most vital bearing on power saving; for no motorman, no matter how well intentioned, can save power if his car docs not roll freely from any cause, the principal one being tight brakes. Instances have come to my attention where tight brakes have caused an increase in power used, amounting to more than 25 per cent. M. F. Skouden, head of the motive power department, has been a firm believer in the possibilities of power-saving, and has co-operated in every possible way toward keeping the cars in the best condition.

On a system such as this, where the cars are heavy, speed high and stops few, we have found that the greatest saving is obtained by coasting the cars over considerable distance at high speed. Lately we have been able to stimulate greatly the trainmen's power-saving efforts by the inauguration of occasional days of special effort. On these days the men have been requested to make the utmost possible effort and to note such results as lowered power consumption, better voltage conditions when all men are making extra efforts to conserve power, count of the number of poles coasted, stops made, etc.

The surprisingly large amount of coasting that can be done is shown by the fact that on one day the aggregate number of miles coasted by all men totaled 36 per cent of the total mileage operated on that day. At the same time we noted a definite and satisfactory reduction of power consumption by the cars and in the output of the power plants. Is it any wonder that results such as these should change skeptics to firm believers in the possibilities of power-saving?

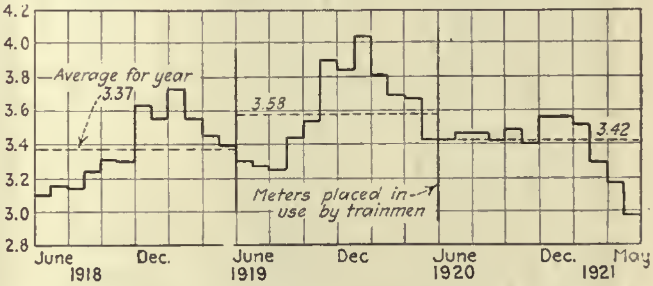
While we could not, of course, go into such a mass of detail for every day's work, we found that these days of special effort have a lasting effect on the power consumption in two ways. First, and most important, the men found it could be done on their individual runs and hence were encouraged to try harder afterward; second, even the skeptics would experiment on different methods of operation, so as to be ready for the next day of special effort. This all helped at the power house.

DOES ENERGY SAVING AT THE CAR MEAN COAL SAVING?

Have we really saved any coal? We have. Due first to power plant improvements and second to efforts to save power at the cars, the coal consumption has been greatly lowered and continues to drop, without any appreciable reduction in miles operated. Taking the figures from our auditor's records of the direct current output of the power plants, together with total miles operated, we find that the unit power consumption during the last seven months of meter operation has decreased more than 10 per cent from the figures for the corresponding months of the previous year. That this saving is reflected at the coal pile is clearly indicated by the fact that a large and satisfactory reduction was made in the consumption of coal per kilowatt-hour generated during the period the meters were in service. This reduction is due, in part, to power house improvements, but they show that the decreased power output did not increase the coal rate.

We have also noticed a very gratifying decrease in the cost of maintenance of equipment since the meters have been installed. While I do not have at hand exact figures on car maintenance, there is clearly a reduction in cost of such items as brakeshoes, motors and other electrical equipment. Mr. Skouden states that we are getting more mileage from our brakeshoes and, that whereas at this time last year we had a number of bad order field coils and armatures awaiting repairs, at present we have a reserve of as many good order coils all ready for trouble, despite a reduction in the number of men at the shop.

Two interesting by-products of our meter installation are the inspection of equipment on the kilowatt-hour basis and the data afforded by the meters on the amount of power used in various kinds of service. Our shop department has found that the inspection periods for different kinds of equipment may be easily regulated through the use of the inspection dials on the meters, which give them a very flexible and easily adjusted unit for inspection purposes. The data as to the amount of power used in different kinds of service have been very valuable in determining the power costs of the various kinds of service, such as freight, express, work train, etc., and have also made it possible for us to determine the amount of power used by our trains.



POWER CONSUMPTION AT D. C. SWITCHBOARD IN KILOWATTS PER CAR-MILE

Mechanical failures of the meters have thus far been so few as to be quite negligible. We have a plan of cleaning and calibrating the meters once a year and this, as well as other maintenance work, is assigned to one of the regular shop employees, who devotes all necessary time to it. The total expense for maintenance is averaging about $10 per month for the 105 meters.

The results which we have obtained have been very satisfactory and have been achieved with very little additional expense. We have had no road instruction for the men, but have relied upon securing their co-operation entirely through our initial meetings, instruction booklets, and the constant encouragement and advice of the operating officials. The response of the trainmen to these efforts has been excellent. We have been able to maintain their interest in power saving and we believe that our trainmen are constantly improving in economical car operation.

Looking back over the year's work, I can see how the steadfast belief of our operating officials that our power bills could be reduced has gradually worked down through the rank and file of our men, myself included, until the results obtained have justified that belief and accomplished the fine results shown in the accompanying curve. I believe that in this branch of work, as in any other requiring co-operation, results may be expected directly in proportion to the degree of faith and enthusiasm plus amount of thought and energy put into it by the officials.

How Some of the Principal Railways in the United States Construct Their Track

DATA COVERING STANDARD TRACK CONSTRUCTION ON SOME OF THE PRINCIPAL RAILWAYS THROUGHOUT THE UNITED STATES

COMPILED BY THE SAN FRANCISCO-OAKLAND TERMINAL RAILWAYS — APRIL 1921

Name of Company	City	State	Type of rail	Type of joint	Tie rod	Tie plate	Cross ties	Ballast	Drain tile	Type of paving	Excavation	Tamping	Joint grinder
Boston Elevated Railway Co.	Boston	Massachusetts	132 lb.-9" girder 122 lb.-7" girder, 100 lb.-6" tee.	Lorain, Thermit, Arc weld.	2¼"x 11/32"	⅜" rolled steel. 1" cast iron.	Southern pine treated by Roeping process. A few Infhall twin steel.	Broken stone 4" to 6" deep below bottom of tie.	6" to 8" vitrified pipe	5" granite block and 3½"x4" wood block laid on concrete.	Hand, and electric Type "O" Thew Shovel.	Air	Atlas, Universal.
International Railway Co.	Buffalo	New York	124 lb.-9" girder	Continuous	Flat	Flat	Yellow pine, 90% Heart, in paved Sts. Oak in open track. Some Carnegie M-24.	8" concrete sub-base, 2" broken rock for tamping.	4" tile	Sandstone block on 8" concrete base	Hand and machine. Keystone shovel.	Hand	Atlas, Reciprocating
Dallas Railway Co.	Dallas	Texas	103 lb.-7" girder, 80 lb.-7" tee.	Apex, Indianapolis.	None	R.R.S.Co.	Long leaf yellow pine.	Gravel.	4" tile	Bitulithic and brick.	Contractor.	Air	Reciprocating
United Traction Co.	Albany, Troy, Cohoes, Capitol District	New York	122 lb.-7" girder, 95 lb.-7" tee.	Continuous	Flat	None	Yellow pine.	Crushed stone and concrete.	None	Granite block.	Hand.	Hand, air.	Rotary Reciprocating
Cincinnati Traction Co.	Cincinnati	Ohio	140 lb.-9" girder	Arc welded channels.	Rail brace	⅜" Flat.	Oak, 2' centers. Carnegie steel M-25, 3' centers.	Concrete 7" below bottom of tie.	4" tile	Granite block.	Thew shovel.	Stone-air. Conc-hand.	Indianapolis, Reciprocating
Chicago Surface Lines	Chicago	Illinois	129 lb.-9" girder, 122 lb.-7" girder 91 lb.-7" tee, 85 lb.-7¼" S.B.	Lincoln, Lorain electric weld.	2"x ⅝"	⅜" shoulder	Long leaf yellow pine, s4s. Some Carnegie steel M-25.	Concrete from 2½" above to 6" below tie. Special construction 8" crushed rock "tie"	None	Granite block.	Hand and machine. Electric + steam shovels	Hand, air, electric.	Atlas, Kerwin.
New Orleans Ry. & Light Co.	New Orleans	Louisiana	105 lb.-7" girder 100 lb. A.S.C.E., 80 lb. A.S.C.E.	Channels on girder. Angles on tee. Some Lincoln weld.	⅞" round.	Brace plates	Long leaf yellow pine, creosoted. Few Infhall twin steel; experiment.	Concrete with girder rail. Crushed rock with tee rail.	Small amount.	Granite and creosoted wood block.	Hand.	Hand	Atlas.
Omaha & Council Bluffs St. Ry. Co.	Omaha	Nebraska	97 lb.-7" girder	Continuous, Thermit, Arc weld.	None	Brace plates	6"x8"-7' red oak treated with creosote, 2 gallons to each tie.	Standard construction 6" crushed stone. Concrete slab where necessary.	Small amt. 6" tile	Vitrified brick block (also granite block) on 7" concrete base.	Thew Auto Shovel.	Ing.-Rand. Duplex air.	Reciprocating
Detroit United Railway	Detroit	Michigan	91 lb.-7" tee	Solid cast weld.-(molten metal poured in molds)	⅞"x1⅛"	None	Johnston steel tie proved failure. 6"x10"-6' 8" N°1 white oak.	Concrete slab under ties, 6:1 mix 8" deep.	6" vitrified crock	Granite nose block adjacent to gauge of rails, with brick between.	Rough grade-steam shovel, finished by hand.	Hand	Kerwin-Detroit
The Capital Traction Co.	Washington	District of Columbia	80 lb.-5" tee	Bolted	⅞"x1½"	None	Oak and chestnut.	Stone.	6" tile	Asphalt and macadam.	Hand.	Hand	None.
The Milwaukee Electric Ry. & Light Co.	Milwaukee	Wisconsin	100 lb. A.R.A., 95 lb.-7" tee.	Cast weld, Thermit weld, Elec. weld.	9/16"x2"	Shoulder	Long leaf yellow pine, white oak, some steel.	Rolled crushed stone, 8" deep.	6" tile	Various, according to city requirmt.	Type "O" Thew Electric Shovel.	Air	Atlas, Goldsmith, Reciprocating.
Kansas City Railways Co.	Kansas City	Missouri	91 lb.-7" tee	Gallor, Thermit, Lorain, Indianapolis.	Unnecessary with rail used ⅞"x2"	None	International twin steel-favorable. Untreated white oak.	Crushed stone 6" to 8" deep Solid concrete 6" deep.	6" tile	Special dressed granite blocks. Brick with granite flangeways, + conc.	Hand.	Hand, air	Own design.
Indianapolis Street Railway Co.	Indianapolis	Indiana	95 lb. 8 13/32" girder, 91 lb.-7" tee.	For past 3 years, Thermit. Formerly: Cast, Lorain, Elec. welds.	⅜"x2"	None	Steel used experimentally 6"x8"-8' white oak.	6" to 8" concrete slab with 3" dry mix concrete ballast.	Some 4" tile	Granite block, or brick.	Type "O" Thew Electric Shovel.	Hand, air.	Atlas, Universal.
Georgia Railway & Power Co.	Atlanta	Georgia	105 lb.-7" girder, 80 lb. A.S.C.E., 70 lb. A.S.C.E. 80 lb.-7" tee, 70 lb.-7" tee, 7" trilby.	Abbott base plate elec. welded, Continuous, plates, Thermit.	⅜"x2"	Flat	6"x8" sap pine, creosoted.	Crushed granite, 6" deep.	6" unglazed tile	Granite, wood, or brick on concrete base. Asphalt on concrete base.	Hand.	Ingersoll-Rand air.	Ry. Trk. Wk. Co. grind., Reciprocating, Atlas Rotary.
The Connecticut Co.	Operates throughout State. New Haven	Connecticut	9" girder, 95 lb.-7" tee 80 lb.-5" tee, 100 lb. A.R.A.	Continuous 24"-4 bolt for tee rail. Cont. 32"-12 bolt for girder. Arc weld.	⅞"x1½" on girder, only.	Lundie, tilted type.	6"x8"-8' wood. (Kind not stated)	6" of gravel or crushed stone under tie	Some 6" tile	Concrete compressed, Hassam patent. Various block, brick, and bitumen.	Hand, Thew Elec. Shovel, Keystone steam shovel.	Ing.-Rand, + hand.	Atlas Rotary, Reciprocating.
Philadelphia Rapid Transit Co.	Philadelphia	Pennsylvania	141 lb.-9" girder	Lincoln Rail Welding & Bonding Co. Nichols zinc and electric weld.	None	None	5"x9"-8' yellow pine.	No ballast used in city work.	None	Granite block on concrete.	Hand	Hand, air.	Chicago Little Giant, Own design.
Pittsburgh Railways Co.	Pittsburgh	Pennsylvania	134 lb.-9" girder	Thermit insert welded joint.	⅞"x2"	Plain flat. Shoulder.	6"x8"-8' white oak.	8" crushed rock below tie.	6" vitrified farm tile	Block stone.	Type "O" Thew Electric Shovel.	Air	Atlas, Universal.
The Memphis Street Railway Co.	Memphis	Tennessee	105 lb.-7" girder	Plain 8 hole bar with base plate, welded to rail.	⅞" round.	⅜"x5½" Various types	Creosoted pine, white oak.	6" to 8" crushed stone.	6" tile	Asphalt, brick, and wood block.	Hand.	Hand	Metal Thermit Co. Universal.
Portland Railway, Light & Power Co.	Portland	Oregon	80 lb.-7" tee, 72 lb.-6" tee.	Continuous	None	None	Narrow gage:-6"x10"-6' fir Standard gage-7"x9" fir.	6" concrete slab with 2" of 1" rock.	4" tile	Now using concrete. Formerly Belgian stone block + vitrified brick with conc.	Hand.	Hand	Atlas, Stow.
The Columbus Ry., Power & Light Co.	Columbus	Ohio	122 lb.-7" girder (A.E.R.A. standard)	Columbus joint, Arc welding.	Only in Macadam.	⅜"x6½" under Special Wk.	Carnegie steel M-25 for standard trk. 6"x8"-7½' white oak for special work.	Concrete and crushed rock.	6" tile	Granite block in heavy traveled streets, and brick in others.	Hand, steam shovel, (prefer Thew shovel)	Hand	Universal, Reciprocating
Birmingham Ry., Light & Power Co.	Birmingham	Alabama	105 lb.-7" girder, 80 lb. A.S.C.E.	34"-8 bolt plates, 26"-6 bolt plates.	Brace plates	Brace plates	Infhall twin steel, estimated cost same as wood. Creosoted yellow pine, std.	6" crushed rock under ties in open trk. 6" slag conc. under ties in paved trk.	None	Straight concrete paving to top of rail. Brick on concrete with asph. [illegible]	Hand.	Hand	Atlas Rotary.
The Denver Tramway Co.	Denver	Colorado	80 lb. A.S.C.E., 65 lb. A.S.C.E.	Continuous, in dirt streets. Arc welded in paved streets.	None	Shoulder	Int. steel about $2,000 per mi. cheaper in new con. Wood about $3,000 per mi. cheaper in reconstr. Infhall twin steel, Oregon, long leaf Texas	Gravel and broken up concrete paving base, 12" to 15" deep.	None	Standard concrete slab.	Hand.	Air	Universal, Reciprocating
Public Service Railway Co.	Newark	New Jersey	116 lb.-7" girder, 101 lb.-7" girder	Lorain electric weld.	⅞"x2"	Brace plates	Long leaf yellow pine, creosoted. Mixed varieties of oak.	6" stone.	Some 4+6" tile	Various kinds. Mostly granite block with cement grout.	Hand and Thew shovel.	Hand, air	Lorain, Kerwin, Gherky Reciprocating, Seymour.
Cleveland Railway Co.	Cleveland	Ohio	95 lb.-7" tee	Riveted and welded, top & bottom. Seam welding with rail wldg. + bdg. mach.	None	None	Cut steel and Carnegie steel, combined. Saving of about $3,000 per mile.	12" concrete below rail.	6" tile	Granite.	Hand and Thew shovel.	Stone-air. Hand	Kerwin.
Brooklyn Rapid Transit System	Brooklyn	New York	122 lb.-7" girder (A.E.R.A. standard)	Cast weld.	⅞"x2" D.E.	None	Steel ties experimentally. Rough sawed yellow pine "Heart".	Natural soil in trench.	None	5" granite blocks, cement joints.	Hand.	Hand	Atlas, Reciprocating.
United Railways Co. of St. Louis	St. Louis	Missouri	132 lb.-9" girder 103 lb.-7" girder, 100 lb. A.R.A.	Nichols. (Few Lorain during war).	Round and flat.	Flat	Oak. Steel ties in special construction, only.	Solid concrete foundation in pavemt. Stone in unpaved streets.	6" tile	Concrete or bricks where possible. Wood blocks laid under protest.	Thew shovel.	Hand, air.	Modified Indianapolis
Twin City Rapid Transit Co.	Minneapolis and St. Paul	Minnesota	Former standard 91 lb.-7" tee Present standard L.S.Co. 93-507	Cast weld, generally. Some Thermit. Arc weld for repairs.	⅞"x1½"	Flat	6"x8"-8' sawed. (Kind not stated)	6" crushed rock under ties, rolled with 8 ton steam roller.	None	Granite blocks prefered. Creosote blocks, asphal. + brick unsatisfactory.	Thew Elec. Shovels (3 in use).	Ingersoll-Rand air.	Detroit-Kerwin, Phila-Reciprolg.
The United Rys. & Elec. Co. of Baltimore	Baltimore	Maryland	122 lb.-7" girder 105 lb.-7" girder, 100 lb. A.R.A.	Rail Welding & Bondg. Co. Cleveland, O. Weld fish and base plates to rail.	None	6"x10" with shoulder.	International twin steel, experimentally. 6"x8"-8' untreated wood.	8" crushed stone under ties.	6+8" tile	Sheet asphalt with granite block liners. Granite block paving.	Hand and Thew shovel	Hand, air.	Ry. Trk. Wk. Co. Phila. Recipro.
Los Angeles Railway	Los Angeles	California	132 lb.-7" girder on curves, 116 lb.-7" girder	Rail Joint Co.'s continuous.	None	Brace plates	6"x8"-6' redwood.	6" crushed rock below tie.	4" tile	2" asphalt surface on 6" concrete base.	Hand and Keystone Excavator.	Air	Vixen planer.
San Francisco-Oakland Terminal Rys.	Oakland	California	141 lb.-9" girder on curves, 106 lb.-9" girder	Rail Joint Co.'s continuous.	⅞"x2½" 6'-0" o.c.	Shoulder	6"x8"-8' redwood.	9" crushed rock below bottom of tie.	6" tile	1½" asphalt surface } 6" concrete base. 2" asphalt binder }	Hand and Keystone Excavator.	Air	Kerwin, Vixen planer.

THE TABLE given above was compiled in April of this year by the San Francisco & Oakland Terminal Railways, which operates the greater part of the local railway service in Oakland, Alameda, Berkeley and other neighboring cities in California, as well as a high-speed line, the "Key Route," with boat connections, to San Francisco. The purpose of this table was to give information in regard to standard track construction in paved streets in some of the principal cities throughout the United States. A questionnaire was sent to thirty leading companies, operating track in paved streets, and the data, as tabulated by the San Francisco-Oakland Terminal Railways, are given in the accompanying table.

The data supplied, as shown, are type of rail, type of joint, tie rod, tie plates, cross ties, ballast, drain tile, type of paving, excavation, tamping and joint grinder.

A Study in Human Nature

Reasons for Labor Turnover—Back-to-the-Farm Movement —War Reaction Evident—Some Go to School— Interesting Data for Alert Managers

MAN is an animal of strange characteristics, particularly the employees of a street railway in the Middle West that has an average of between 550 and 650 conductors and motormen on its payroll. The accompanying is a remarkable document for use in the study of labor turnover and the railway company has a good psychologist in its organization.

The time and labor necessitated in the keeping of such a record should not be compared to its value in handling labor, to say nothing of its value to industry in general. Little things grow into large ones if neglected and the crews are the transportation salesmen in the railway industry. Any data that help the industry to understand the psychology of its crews are welcome.

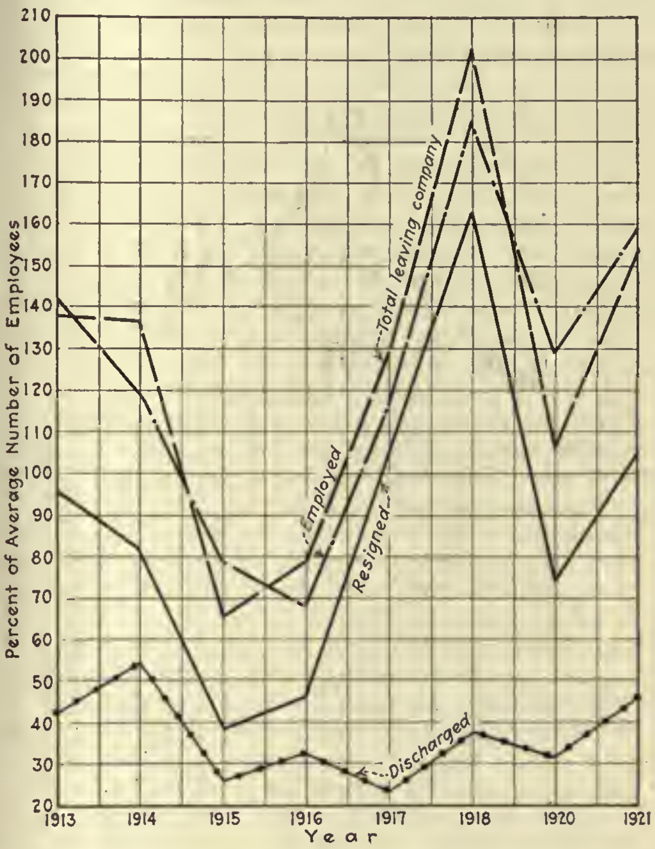
The curves show the labor turnover for a period of several years and reflect countrywide psychological and business conditions. The business depression in 1915-1916 is reflected in the labor turnover—men held on to their jobs, although in 1916 a back-to-the-farm movement started. The war ebb and flow shows in the curves for 1917-1918-1919. Resignations increased for the purpose of going home or going back to the farm or joining the army or navy. Why did so many men go back to the farm? Living costs, wages and the boom in farm products no doubt answer the question. Very remarkable is the fact that few men were discharged as undesirable in this period, honesty was at a premium and collisions at a minimum. Even the Volstead law functioned well according to the data on the accompanying table.

Then from 1919 to 1920 the reaction from the war begins to have its effect as well as the high costs and wages as reflected in the table. The men still remained sober, but began to joy ride and feel their oats as evidenced by the increase in the number of collisions,. the large number laying out and the failures to enforce rules. Register irregularities increased and an increase in turnover occurred because of going home, going to farm, going to another job and quitting to keep from being fired. A general "don't care" attitude in 1920 in all industry is reflected in the labor chart of this company.

A table of this sort is a valuable thing for an alert manager to study and more tables of this kind should be available.

STATEMENT SHOWING CAUSES OF MEN LEAVING SERVICE
1913 to 1920 Inclusive

Resigned Cause	Motormen and Conductors 1913	1914	1915	1916	1917	1918	1919	1920
Sickness	79	49	32	21	30	21	16	20
Sickness in family	43	45	9	8	6	..	2	2
To go home	52	108	89	88	194	273	189	278
To go to school	9	21	3	10	4	6	15	18
Short of funds	..	..	..	..	..	..	1	2
Don't like the work	94	81	26	11	22	39	31	70
Can't stand the work	19	20	15	6	2	12	3	4
Can't make a living—Can't get enough work	18	15	8	9	10	6	6	4
Can't stand the climate	..	..	..	..	..	2	2	6
Can't stand cold weather	6	..	..	..	2	2	1	..
To take another position—Going to farm	78	28	23	78	146	237	140	199
To attend to personal business	..	..	..	..	..	..	..	..
Dissatisfied	61	8	5	4	1	2	1	4
Too much responsibility	..	..	..	..	..	..	..	..
To keep from being discharged	11	15	..	3	9	31	23	55
Tired of work	11	5	..	..	2	..	1	..
Don't like the run	6	4	..	..	..	1	..	9
Wrong end	3	3	3	1	1	3	2	2
Could not learn	8	7	5	..	2	12	6	11
No reason given	11	7	..	..	7	39	4	10
Army and Navy	..	..	..	..	48	38	2	..
Miscellaneous	20	8	1	20	37	25	12	18
Total resigned	529	424	219	259	523	749	457	712
Discharged:								
Incompetent	54	..	..	1	23	25	14	22
Short register—Register irregularities	26	99	42	22	10	19	72	80
Drunk	..	12	8	11	2	4	2	1
Drinking on duty	5	4	..	..	4	7	1	..
Lied on application	6	14	10	7	4	3	11	7
Gambling	..	..	3	..	..	..	..	5
Immorality	..	..	..	..	1	..	2	2
Failure to make accident report	..	2	2	2	1	1	1	1
Failure to get witnesses	..	..	..	..	..	..	..	..
Failure to enforce rules	6	14	9	13	4	..	8	12
Undesirable	33	31	31	8	3	4	12	10
Discourteous to passengers	2	7	2	1	..	..	..	..
Running late	..	..	..	..	..	1	..	..
Laying over at end of line	..	..	..	..	..	..	..	2
Failure to report—Misses	..	..	..	3	5	7	1	2
Defective eyesight	..	..	..	..	1	1	..	..
Smoking on duty	..	..	..	..	..	..	3	5
Riding on front end	..	..	..	..	..	1	..	1
Insubordination	21	20	9	5	3	3	1	5
Quick bells	..	..	..	..	..	..	..	..
Short changing passengers	..	..	..	..	..	1	..	..
Laying out	10	3	1	1	..	15	19	38
Carrying passengers on front end	..	..	..	..	..	..	..	..
Refusing to obey orders	8	7	..	2	2	20	4	15
Continually short in settlement	..	..	..	..	..	..	..	..
Indifferent	..	6	4	1	..	..	2	3
Using wire for fuse	..	..	..	..	..	..	..	..
Misappropriation of articles left on car	..	..	..	..	..	5	..	12
Manipulation of transfers	..	..	..	..	..	..	..	..
Car collision	19	17	21	30	21	23	27	47
Train collision	1	2	..	..	1	..	..	..
Vehicle collision	22	29	4	13	2	1	6	10
Reckless	5	6	..	..	1	2	..	2
Account of accidents	1	4	1	3	3	6	4	5
Abusing car	1	4.	..	..	1	1	1	2
Running railroad crossing	..	..	..	..	2	1	2	2
Agitators (later reinstated)	..	..	..	50	..	..	..	..
Miscellaneous	13	3	..	13	23	22	7	26
Total discharged	233	284	147	186	117	173	200	317
Promoted and transferred	1	5	2	..	2	6	1	4
Deceased	1	3	2	..	1	4	3	2
Grand total	764	716	370	445	643	932	661	1,035
Employed	783	621	446	387	580	841	800	1,067
Average number of regular employees	551	521	567	564	500	458	620	674



GRAPHS FOR LABOR TURNOVER FOR EIGHT YEARS

The Five-Cent Fare as It Affects the Electric Railway Employee

By ALFRED A. GREEN
New York, N. Y.

KNOWING something of the electric railway game, obtained through intimate connection with railway work for the past fifteen years, I wish to express a few thoughts in regard to the awful howling about increasing the 5-cent fare that comes from the different political aspirants of the great city of New York. It is quite evident that none of them ever depended long on a pay envelope for services rendered to an electric railway or they would have gained sufficient knowledge to know that if the wages paid to men on cars and in the shops were sufficient to care for their families and educate their children as they should be the railways could not operate successfully on a 5-cent fare.

Newspapers during the past two or three months have contained items stating that the men on this or that road have accepted a reduction in pay so as to help the railway company which employs them to meet its operating expenses, and why? Because the low rate of fare does not bring in enough income and the politicians cannot permit an agreement made during the old horse car days to be changed for fear they would lose the vote of some poor mortal whose thinking capacity cannot carry him beyond 5 cents no matter what the results may be. There are hundreds of such people who would deprive the railways even of their 5 cents.

The men on the old horse car lines received less compensation for their labor and worked longer hours than men on any other known employment, and it was these men who were taken over to operate the cars and to do the repair work when the street railway systems were changed from horse to electric propulsion. The amount paid to the different classes of workmen varied from $1.25 for twelve hours work to a maximum amount of $2.25 paid first-class mechanics for ten hours work. It is also a fact that wage rates on electric railways did not increase in proportion to other trades during the years previous to America's entering the war, and the greatest increases received were during the last two or three years, and still the wages cannot be compared with those received by other men doing work less arduous and having less responsibility.

In many cities outside of New York there must be men of broader intelligence and less bigoted who have realized that the electric railways cannot pay the increased cost of material and labor with the same 5 cents that previously permitted them to exist by paying their labor the smallest wage possible. Fare increases have been allowed and in many instances the fare has been doubled in order that the railroads could pay their honest debts and still pay the men on the cars and in the shops a living wage.

Reducing pay does not make faithful employees, but under circumstances that exist in New York City it is the only alternative, as these railways have not been permitted to raise fares because the men at the head of the city government decided that there is more political pull with the masses than with the men and their families that depend upon the railways for an existence.

The motorman, the conductor, the pitman, the overhauler and all the other classes of workmen necessary for the operation of the railway have not entered into the scheme of things as far as the politician is concerned, and the one thing that blights the politician's vision to all else in this vast universe is a 5-cent piece.

The question that each electric railroad employee should ask himself today is: "What can I as an individual do to bring about improved conditions for myself and the company that employs me, because its success is intertwined so closely with mine that neither can win alone."

This is a positive fact. A trainman or shopman may be only a small unit of the whole on a large property, but the success of the whole depends upon the success of its smallest unit. So it is necessary for each man to learn from the past and present as to what his duty is when the opportunity comes for him to express his will as to who is a real friend and who is broad enough to look beyond the nickel to a point of fairness to all.

Letter to the Editors

Baltimore's New Type Safety Car

STATE OF NEW JERSEY
BOARD OF PUBLIC UTILITY COMMISSIONERS
NEWARK, October 4, 1921.

To the Editors:

I have noted with very great interest the article contained in the issue of Sept. 10, 1921, entitled "Baltimore's New Type Safety Cars." I note that while these cars are practically of the same general design as what might be called the standard one-man safety car, yet it has been found perfectly practical to equip them with a wider door opening and wider aisle, thus providing a means for more rapid passenger interchange with only a minor change in the seating arrangement.

Ever since the one-man safety car was first put in operation I have been a very strong advocate of providing a wider door opening, an objectionable feature of the car having been, to my mind, the fact that passengers cannot board and alight at the same time. This has also been a source of much complaint on the part of the patrons of the cars, according to my experience and observation, and it has of course been detrimental to the successful operation of the car as far as running time is concerned.

I am very glad to learn that at least one company has undertaken this desirable change in the design of these cars, and am further pleased to note that the result has been a considerable saving in time of loading and unloading, which, of course, was to be expected. I trust that other companies will see fit to follow the same method of improving the use of the one-man safety car.

H. C. EDDY, Street Railway Engineer.

Standards for Consideration

THE American Engineering Standards Committee announces that the American Society for Testing Materials has submitted eleven standards for consideration and approval. Among those of interest to electric railways are the specifications for steel forgings, methods of analysis of manganese bronze and gun metal, steel specifications and drain tile specifications. The American Society of Safety Engineers has been designated as sponsor for a safety code for compressed air machinery. This code will include rules for the construction and use of compressors, tanks, pipe lines, etc.

Equipment and Its Maintenance

Short Descriptions and Details of New Apparatus of Interest to the Industry. Mechanical and Electrical Practices of All Departments

A Variable Speed Polyphase Motor

THE forced draft fan equipment with push button and pressure regulator control recently put into operation at the Springdale Station of the West Penn Power Company by the Westinghouse Electric & Manufacturing Company is of special interest as it includes a comparatively new type of polyphase, alternating-current, variable speed, brush-shifting motor. This motor eliminates the objectionable poor efficiency and limited number of speed points inherent with slip-ring induction motors and provides a satisfactory and easily controlled alternating-current fan drive which can be applied to power plants. The installation is the first application of the motor to this type of work, with full automatic control.

The forced draft equipment for each boiler consists of one centrifugal fan having a capacity of 90,000 cu.ft. per minute at 5.9 in. water gage pressure, 65 deg. F., and 770 r.p.m. The fan is driven by a motor which is rated normally as a 150-hp., 720-r.p.m., 2,200-volt, three-phase, 60-cycle motor, with push button and pressure regulator control.

The motors are capable of operating at over synchronous speed and have sufficient capacity to drive the fans at 865 r.p.m. intermittently and 825 r.p.m. continuously. The lowest operating speed required is 355 r.p.m. This results in a total speed range of 2.4 to 1. The maximum limit of 865 r.p.m. corresponds to full load speed of 900 r.p.m. for slip-ring induction motors which permits direct comparison with the latter.

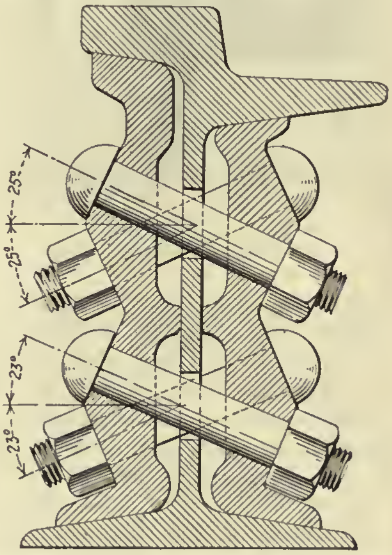
The motor consists of the stationary member or stator, the rotary member or rotor and a transformer connecting the rotor in series with the stator. The stator has a distributed winding and is similar to the ordinary induction motor. The rotor is in appearance and design essentially like that of a direct-current motor except that for the brush shifting motor the armature voltage is considerably lower, being approximately 80 to 90 volts. The rotor transformer is simply a series transformer with the primary in series with the stator of the motor and the secondary connected to the rotor through brushes and commutator. This transformer not only supplies a lower commutator voltage but also, by its ability to become saturated, limits the no-load speed of the motor.

The control required for operating the motor is extremely simple, consisting merely of a switch for connecting the motor stator to the line and some mechanical means of shifting the brushes, the starting current being determined by the position of the brushes. The control at the Springdale Station provides for over-load and under-voltage protection with push button start and stop in addition to automatic speed control from a pressure regulator or from two push button stations. Another feature is that the motor stator is connected for pole changing with automatic reshifting of the brushes to compensate for the accompanying change in speed. The actual equipment necessary to provide these features consists of a primary control composed of a line contactor panel with necessary interlocks, and a secondary control composed of the brush-shifting pilot motor, gear train and drum control switches, arranged for pressure regulator control through the rope wheel or for push button control.

From actual test data in comparison with a standard slip-ring 900-r.p.m. motor of the same size under the actual fan load and for the same range of speed this motor shows a very much higher efficiency and power factor.

New Splice Bar for Girder Rail

THE accompanying illustration shows the Heinle rail joint which is now being marketed. With this type of joint the bolts are placed at an angle with the intention of taking care of the principal stresses more effectively. Some of the economies claimed for this type of splice bar are that it can easily be rolled and punched, weighs less per pair, gives greater efficiency and eliminates structural fracture due to bending stresses. The bolt arrangement can be supplied to various types of rail joints and other fabricated joints.

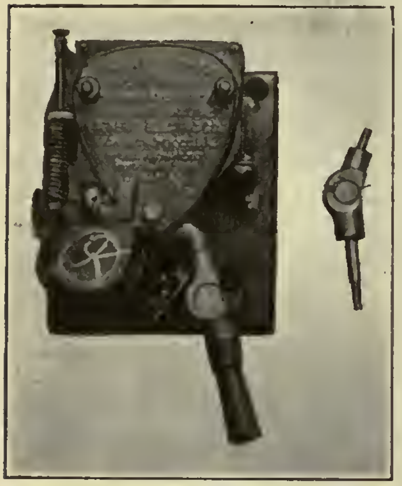


Truss Fastening for Girder Rail

New English Trolley Stand

A NEW trolley stand has been brought out in England which is fitted with roller and ball bearings and among other advantages it is claimed it is superior in strength and has extremely lightweight, few wearing parts, is easily adjustable and has an absence of friction. It is further claimed that damage due to rebound is reduced to a minimum. A considerable number of these have been in service for some time and have proved successful, having cost practically nothing for maintenance. This is due to the introduction of a roller bearing around the center pivot, which not only reduces friction to a minimum but renders the standard practically perfect for either straight, under running or side running, the dewiring of trolley heads being almost eliminated. The relation of the pivot end of the pole sockets to the axis of the pivot end—to which the spring ends are connected—is so arranged that although the inclination of the pole to the vertical increases, the tension on the trolley wire remains constant. Instead of one or two large springs being used, this stand has two batteries of springs, which by special arrangement make the standard very flexible and compensating at all points. It is also provided with a special buffer spring mounted in such a manner that should for any reason the trolley come off the wire, the blow to the standard caused by the pole rising is very considerably lessened. The trolley stand is the product of Brecknell, Munro & Rogers, Ltd., Bristol.

Hinged Circuit Breaker Handle



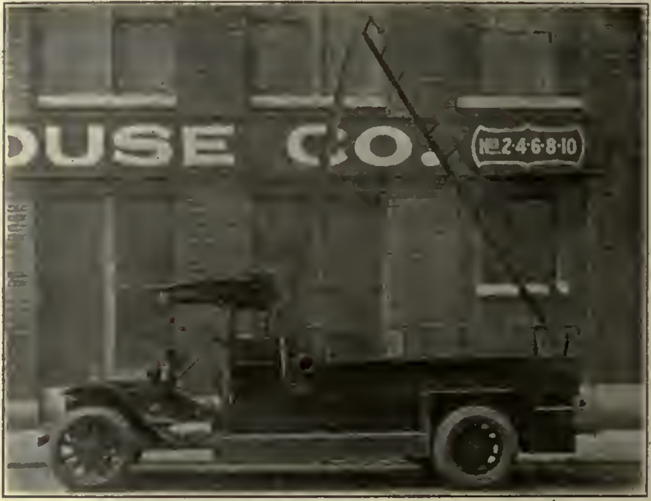
CIRCUIT BREAKER WITH HINGED HANDLE

THE use of two kinds of circuit breakers on the same system, one that can be knocked out with the handle, and the other that requires tripping at the magnetic trip, is very confusing to motormen, who are likely to make a mistake and hit the handle of the trip breaker. This frequently breaks the handle or at least loosens up the various parts and causes delays in service as well as frequent repairs. The Portland Railway, Light & Power Company has overcome this difficulty by putting a hinge in the handle of its trip breakers as shown in the accompanying illustration. This hinged handle is arranged so that it will push the breaker closed, but if it is pulled in the opposite direction the hinge will allow the handle to swing back so as not to break the catch. The use of this type of hinged handle has done away with trouble of the nature described.

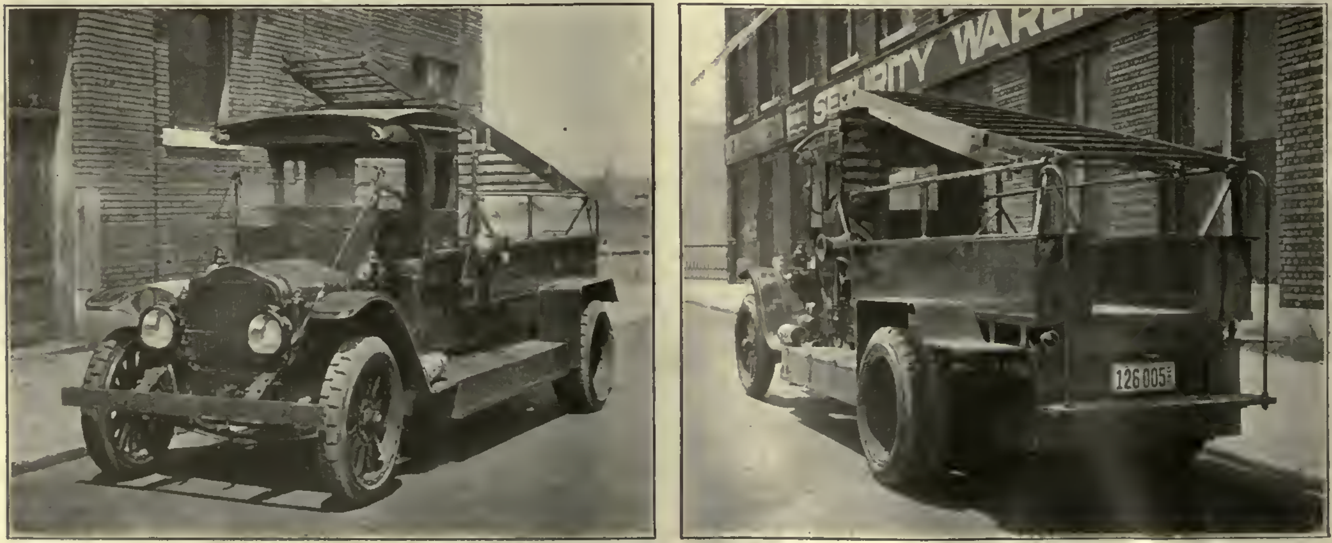
Atlanta's New Emergency Truck

A NEW emergency truck equipped for service in almost all classes of emergency has just been put into service by the Georgia Railway & Power Company, Atlanta, Ga. The truck is built on a 2-ton White chassis. The body is entirely of steel and was built at the shops of the company in Atlanta.

As noted in the accompanying illustration, the truck is substantially built and is equipped with an "A" ladder to be used by linemen in event of trolley break. It is also equipped with a winch for use in rerailing cars or removing obstructions from the tracks. The box on each side of the car carries within it one hose bridge for spanning six lines of hose and a complete outfit of jacks, blocks, plates and other tools necessary for use in clearing obstructions, rerailing cars, etc. In the event of the truck going to a derailment accident, it passes one of the main carhouses in Atlanta and picks up whatever additional help is required. The truck is manned twenty-four hours per day by one lineman and one competent driver. The latter is in charge of rerailing cars. The truck answers all fire calls in order to lay its hose bridge if required and is otherwise under the call of the railway company's central dispatcher's office at all times during the twenty-four-hour period.



EMERGENCY TRUCK WITH "A" LADDER IN POSITION FOR LINEMAN'S USE



TWO VIEWS OF ATLANTA'S NEW EMERGENCY TRUCK

Proceedings of the Claims Association

The Discussion at the Atlantic City Convention of the Claims Agents Centered on Methods of Handling Complaints—Some Delegates Urged a Close Follow-Up, Others Preferred Waiting for Claimant to Present Case—Other Topics Considered in Interesting Sessions.

J. J. REYNOLDS
President, 1920-21

THE American Electric Railway Claims Association held three sessions at its annual convention in Atlantic City, Oct. 3-5. Of these meetings, one, that on Tuesday afternoon, was a joint meeting with the Transportation & Traffic Association and was reported in the issue of this paper of Oct. 8. Reports of the meetings on Monday, Oct. 3, and Wednesday, Oct. 5, appear in this issue.

Monday's Session

John J. Reynolds, claims attorney Boston Elevated Railway, as president of the American Electric Railway Claims Association, called the convention to order for its first session on Monday afternoon. An abstract of the presidential address by Mr. Reynolds follows.

ADDRESS BY PRESIDENT REYNOLDS

"When a number of men, keen, openhearted, sympathetic and observant, as claims men are, come together from different places with widely different notions and freely mix with each other, they are sure to learn from one another. They gain for themselves new ideas and views, fresh matter of thought, and there is much to generalize. Generalities, it is true, get us nowhere, but it is just as true that we get nowhere without generalities.

"I wish particularly to emphasize the importance of the Claims Association in the general development of our relations and work. This association is practical in character and aim. It is the voice of the American electric railway claims departments, becoming articulate through its members. Every phase of claims department work is represented in its activities, hence the association exerts a vital influence on claims men.

"If there is a better way of doing our work than the way we are doing it, we want to know it; therefore it is surely worth our while to keep in touch with what of merit is being done along our own particular line. If we fail to do this, then our department is not running at its highest efficiency. Through this association we may share in the very latest ideas and progress in claims department work and thus prepare ourselves to enter aggressively on those duties, the details of which positively demand long and expert training. What we want is not passive acquiescence, but active co-operation.

"There is no body of men affiliated with the electric railway industry more capable of promoting the special interest of the industry than the men who go to make up the claims association. It should be of some interest to note that through the instrumentality of the claims association the everyday work of the claims man is now developed to a point where it embraces problems, apart from the mere settlement of claims, which add to the protection, safety, comfort and convenience of the car rider and of the traveling public generally. One of the supreme interests of claims men, whether representing a property which is large, small or otherwise, should be concerned with developing safe methods of operation and conduct. There is not a moment, nor circumstance, that can minimize this ever-present and all-important fact and duty. What is perhaps not quite so obvious, but nevertheless equally certain, is that this association takes the larger, the higher and the broader view of accident prevention education.

"We all appreciate the fact that the one great agency for the perpetuation of our effectiveness as a body is team play. Neglect of this fact results in an obscured vision of our duty and in an improper conception of basic principles. It is also a dangerous portent that half-hearted interest is a communicable disease.

"The 'up-to-the-minute' member will find in the papers, addresses and discussions in our annual reports an abundance of topics of large practical significance which may be used to advantage and with which he may stimulate with sound principles the departmental life of his immediate organization. Nothing yields better results than an intimate acquaintance with the thought-output found in those reports, for there is material already prepared for us. Speaking of these reports suggests to me the advisability of the association considering the compilation of this large body of information into an index or digest. Much has been written by claims association members which, were it classified and arranged under proper heads and titles, would make a volume that would be of service to claims men, a systematic arrangement that would take the form of a digest or an analyzed summary of the papers, committee reports and certain matter contained in our former question boxes, much of which contains matter of immediate practical value. This could be arranged and the work separated and classified under the various subjects which have been treated. The titles, divisions and subdivisions of relative principles and subjects could be cross referenced, thus making unnecessary those useless repetitions which now take so much time if one wishes to find a particular point or question which has been treated.

C. G. RICE
President, 1921-22

"The deep concern of the claims association for the state of the industry leads me to remind you that there probably was never before in the financial history of the electric railway industry in this country a graver moment than the present. This lays a responsibility upon each of us to determine in shoulder to shoulder action to lighten the burden of the railways as much as we can. This should be one of the chief aims of both the individual and the association.

"The Claims Association has a mission, and it is fulfilling it. It could be ill spared from claim department life. Open to criticism at many points it may be, yet I venture to state it has done more for our professional future than any other agency, and it has served to mark for all time a high measure of solid advance and the disappearance of a retrogressive period. In conclusion, I gladly seize this occasion to make known to the members my deep gratitude for the great help given me by their readiness and willingness to execute any suggestions or commissions given them during my administration. This applies with special emphasis to Mr. Kubu, the efficient secretary of your association during my term of office."

COMMITTEE REPORTS

The report of the executive committee was then read. This was followed by the report of the secretary and treasurer. The latter gave the income and expenses of the association, which are shown in the report of the secretary and treasurer of the American Association, published in the issue of Oct. 8, page 610. The report of the committee on interchange of claims statistics was then read.

The committee reported that owing to the small number of requests which had recently been received for this information the data would not be compiled for this year at least. The committee also reported that the old form of questionnaire, known as Data Sheet No. 7, could not be materially improved until the various companies could agree upon a uniform method of accounting in their claims statistics. The report was signed by H. E. Briggs, chairman; W. F. Weh and J. S. Kubu.

FOLLOWING UP PROSPECTIVE CLAIMANTS

The paper by Louis H. Butterworth, attorney Boston Elevated Railway, on "Constructive Argument as Opposed to Destructive Contentions in Accident Investigations and Adjustment," was then presented. This paper is published in abstract on another page of this issue.

The discussion on this paper centered largely upon a statement in the paper that it was desirable to give a copy of the complainant's statement to him when it was given after an accident, and the extent to which the department should follow up injured claimants before suit.

A prominent claims attorney, arguing it was not necessary or desirable to give such a copy, declared that if the complainant is acting in good faith he will stick to his statement on the stand later, even if he does not have the statement. On the other hand such a copy would permit a complainant not acting in good faith to know just where he can deviate from the statement without contradicting himself. This claim agent did not agree also with the author of the paper that the claim agent should always decline to entertain any claim where a medical examination was refused. While he thought a medical examination is desirable, it is not always necessary, as with a broken leg, nor is it always possible. He did, however, often show to the attorneys of a claimant, when he knew them well, copies of the statements of four or five of his witnesses. In this way, by putting his cards on the table he has been able to make settlements and avoid lawsuits.

Another claim agent declared that he gave reports to no one. His position was that it was desirable to impress on the public the desire of the company to act fairly in every way, and when it came to an actual suit the plaintiff was allowed to understand that he should take care of his own case and the defendant would do likewise. He opposed the idea of frequent calls from the adjuster on an injured claimant. Claimants, he said, who are petted too much by a zealous claim adjuster or investigator have an exaggerated idea of the extent of their injuries. His idea was a single visit unless for final adjustment. He urged, however, the settlement of suits for small amounts, even where the company was not clearly liable, as cheaper than paying the cost of a trial.

Another claim agent, in speaking about the reference to psychology in Mr. Butterworth's paper, said much depended upon the ability of the adjuster to get in touch with claimants. One of his adjusters began railway service as a conductor on the horse cars, but has special ability to understand human nature and get the claimant's point of view. This man is one of the best adjusters in his department.

Another speaker said that a man well informed on the principles of constructive psychology was bound to make a better claim agent than one who had not made such a study. He agreed with the first speaker that it is not desirable to give a copy of the complainant's statement to him. In regard to the refusal of a medical examination, his experience was that this refusal occurs a great deal more frequently than most people realize. An examination may be made immediately following the accident, when it is less liable probably to be refused than at any other time and for that reason that is the important time to obtain it, if possible, or it may be made when the lawyers for the two sides are having the matter up for discussion, or it may be requested while the case is actually on trial. A competent doctor should always be employed so that the report shall be complete. He urged that the fact that an examination by a medical man employed by the company has been made gives the claimant or his attorney a very good excuse for refusing another. This means that a competent and experienced physician should be employed. Moreover, to have a medical examination worth anything it should be complete. He cited a case where a medical examination had determined that the patient, a woman, was the victim of neurasthenia due to some long standing pelvic disturbance. This fact proved very useful when a claim was made by her that her backache, headache and other general troubles were caused by an accident. He disagreed with the suggestion of the previous speaker that it is desirable to compromise non-liability cases because it is cheaper to do so for a small amount than to fight them.

The next speaker approved the idea of giving to complainants copies of the statements made by them. His experience in life has been that people like those who like them, and when a man goes into a house and the people like him they will like his company and will tell him all about the accident. It may be wise to call again or it may not be. In some cases he has called a dozen times because he wanted to know how the people were getting on and also because he hoped to adjust the case. He added, sententiously, that no one knows whether the company is to blame until after the case has been tried.

The paper by Mr. Green on "Essential Points to Cover in Accident Investigations" was then read by the secretary. In the discussion which followed a variety of opinions was expressed on the plan of giving statements to claimants and making medical examinations, several taking the ground that no universal rule could be followed, and some that no doctor should be sent unless his services are requested by the injured person. One advocate of the principle of calling said that he thought the injured person would often be willing to settle if the company's representative called, but because they didn't he often would take up the case with the ambulance chasing lawyer.

Wednesday's Session

The session on Wednesday of the Claims Association was held in the morning by resolution of the executive committee and the first action was the appointment of a committee to prepare resolutions on the death of Mr. Carpenter, formerly president of the association. The chairman then announced a paper by Walter E. Robinson, claim agent Cincinnati Traction Company, on "What Should Be the Method of Claims Department in Handling Accidents and Claims." An abstract of this paper appears on another page of this issue.

METHODS OF HANDLING CLAIMS

After the presentation of the paper, Mr. Robinson, in answer to a question, said that there was very little "ambulance chasing" in Cincinnati. At one time there had been, but it had about disappeared because the company had declined, as the speaker said, to do "ambulance chasing" itself.

The discussion which followed related principally to the extent to which it was thought desirable for the claim agent to follow up a claimant or possible claimant after an accident.

One delegate, who thought accident cases should be followed up promptly, said that while he believed that a claim department should not be overmanned, there should be a sufficient number of employees so that the department will take care of its work as expeditiously as possible. Time in a claim department, according to him, repays all the dollars for every minute that goes by after an accident has happened, because when a person is injured, his injury seems to increase in his mind with the passing of days. The doctors have often said that "the gold cure" is one of the most effective for the early cure of a patient suffering from a railroad injury. It is not necessary to have all the men on a salary basis. If responsible men are on call, that will answer. The speaker had found young lawyers to make the best kind of claim assistants as they understand the points and facts which relate to the case.

The latter statement was taken up by another delegate who declared that an assistant in the department who is not a lawyer is often better because he is less apt to be technical in his testimony. He added that he encouraged claimants to come to his office and thought that this was the natural thing to occur to them to do rather than to stay at home and wait for the agent from the company to call.

Other speakers then urged the advantages of waiting for claimants to call, while still others urged a prompt following up of possible claimants.

One prominent claim agent referred to the effect which circumstances have on settlements in claim cases. They may be influenced, he said, by an apparently insignificant act or word. When a jury, getting ready to return a verdict, was attracted by a collision outside, it brought in a very large verdict. Other factors are topographical conditions, climatic conditions, the history of the company and whether its attitude toward the public as a corporation is antagonistic, friendly or intermediate, the character, nature, experience, occupation of members of the jury, etc. The attitudes of the attorneys who try cases, in the speaker's opinion, have also a material bearing, as has the attitude of the newspapers during the past and the present, and the nature, kind and variety of the accidents that occur on the property. The speaker believed the practice used in Cincinnati referred to in Mr. Robinson's paper was a desirable one, but he was doubtful whether many other companies could follow it.

Another speaker said many cases were overinvestigated and many investigations were misdirected, though in general he recommended making a very exhaustive investigation. He questioned Mr. Robinson's argument that ambulance chasing proceeds from an effort to get ahead of the claim agent and that if the claim agent does not act the ambulance chaser will cease his activities. He thought that the activities of the ambulance chasers were caused by competition with each other, rather than by competition with the claim agent.

The claims representative of a large company in the Middle West thought there was some danger in magnifying in the mind of the injured person the seriousness of an accident by too frequent visits. On the other hand he believed that certain cases ought to be followed up most thoroughly, especially if there is any suspicion of fraud. He said that a successful claim agent with whom he was acquainted followed the policy that if a case showed signs of liability on immediate investigation quick settlement was the cheapest in the end, though it costs more than the case was worth. At the other extreme, a case where there was no liability should be fought to the bitter end regardless of cost. In the doubtful cases, individual judgment had to be used. If all cases were on the square, the speaker doubted if claim agents would be needed. Again, as regards visiting the claimant, much depends on the character of the road. On a road extending from, say, New York to Chicago, it would be impracticable for the claim agent in his office to wait for claimants to call.

OFFICERS FOR NEXT YEAR

At the conclusion of the discussion the nominating committee presented the following nominations:

President: C. G. Rice, superintendent claim department Pittsburgh Railways.

First vice-president: Wallace Muir, claim agent Kentucky Traction & Terminal Company, Lexington, Ky.

Second vice-president: W. H. Hyland, claim agent Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y.

Third vice-president: Howard D. Briggs, assistant general claim agent Public Service Railway, Newark, N. J.

Secretary-treasurer: E. L. Lindemuth, claim agent Wilkes-Barre (Pa.) Railway.

Executive committee: G. B. Proctor, claim agent Memphis (Tenn.) Street Railway; W. G. Fitzpatrick, general claim attorney Detroit United Railway; T. B. Donnelly, claim agent West Penn Railways, Pittsburgh, Pa.; S. J. Harrell, claim agent Knoxville Railway & Light Company, Knoxville, Tenn.

Mr. Rice, on being escorted to the chair, expressed his honor at the election and solicited the co-operation of the members in making the work of the Claims Association a success during the coming year.

Conducting Accident Investigations*

An Investigator Should Acquaint Himself with the Employee's Theory of an Accident as Well as the Physical Features Surrounding It—Ingenuity in Interviewing Plaintiffs Often Uncovers Fraudulent Claims

By R. C. Green
Attorney Cleveland (Ohio) Railway

DURING the past decade there has grown up in our midst, especially in the larger centers of population, a business which in its return of profits has exceeded the dream of the most sanguine. I refer to the personal injury damage business. And in this connection the word "business" is used advisably. This particular branch of the law is no longer regarded as it was in times past but in the personal injury field today we find law firms devoting their time exclusively to this particular branch of the practice, with well-developed organizations for the securing of business, the adjustment of cases and their preparation and trial in court.

The adoption by most of the states of workmen's compensation laws has robbed this field of much good business and the result has been that many cases which heretofore would have been given little, if any, attention have been exaggerated and built up into what appeared to be real damage suits. This has fallen more heavily perhaps upon public carriers than upon others.

Confronted by this condition of affairs the question necessarily presented is how may one who represents the interests of a carrier of passengers most effectively meet this situation and cope with it. Many answers are presented, but it would seem that the thing most essential is an honest, comprehensive and intelligent investigation; one that will withstand the rigors of an action at law, for the possibility of litigation should always be considered in every case under investigation.

It goes without saying that the ultimate object of every investigation is the truth concerning all the essential facts surrounding an accident. In most instances these facts are ascertainable from the public alone, and one going out upon an investigation is called upon to meet and interview men and women in all stations and callings of life. An investigator to be successful should study human nature. He should be a person of good address, capable of meeting and securing the attention not only of the man in the factory, but the business or professional man as well. His errand is one which means nothing to the person being interviewed. He is not only there securing certain information, but is taking up the time of the interviewed as well. He, therefore, must cultivate a pleasing manner which will gain him entreé with all. Brevity, conciseness and going straight to the point covering the essentials are always appreciated by our ever busy public.

The great majority of the claims that arise from the operation of a street railway system are those made by passengers. In a myriad of ways injuries to this great class are claimed to occur.

GET THE EMPLOYEE'S STORY

If possible the investigator before starting out on a case should have before him not only the theory of the employee as to how the accident occurred, but the alleged claims of negligence set forth by the injured party. If the matter be in litigation, he is, of course, supplied with the petition, as it is called in our jurisdiction, which sets forth the claimed injuries and the alleged negligent acts. If not, the signed statement of the injured party is of great benefit. Aided by this, he is able to go to the very crux of the controversy and secure from the disinterested spectators the information which should be determinative of the matter at issue.

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*Abstract of paper presented at the annual convention of the American Electric Railway Claims Association, Atlantic City, N. J., Oct. 3-6, 1921.

In the investigation of the claims of passengers, the inquiry might be divided into three heads:

First: What were the physical features concerning the accident?

Second: What was the conduct of the employee against whom the negligent act is directed?

Third: What was the conduct of the claimant himself?

The physical features concerning every important accident where time might have the effect of destroying this evidence should always be preserved by photographs. Many cases where such evidence is lacking are lost to the defendant by the adroit argument of plaintiff's counsel that were the facts contended by the defendant true, they would have been supported by photographic evidence. This silent, irrefutable evidence in an investigation, which defies impeachment, has a value far in excess of human fallibility.

A large percentage of the platform men either have forgotten or else have never known, that the good will of the riding public is a valuable asset and that courtesy is about the only means they possess of acquiring it. It therefore follows that when their conduct is under scrutiny they and their employer labor under a handicap, the statements of witnesses often reflecting their feelings toward the employee. This, therefore, becomes a matter for the investigator to overcome, and of course he must rely upon his own initiative with suggestions tending to placate, if possible, the feelings of the hostile witness. On the other hand, the injured party having the natural sympathy of a fellow passenger usually loses no advantage in the telling.

As to what should be elicited from a witness in a given case, or class of cases, little can be said without resorting to the elementary.

The advent of the automobile has had the effect of bringing into existence certain traffic legislation which heretofore was unknown, and in many cases it is not at all difficult to discover where the driver, for instance, of an automobile has been guilty of the violation of certain traffic ordinances which may have been a contributing cause of his accident. An investigator should, therefore, thoroughly familiarize himself with the traffic ordinances of the city. He should have a knowledge of the law of negligence generally applicable to street railway cases, and he should keep posted, if possible, on the late decisions. Not only that, but he should know the layout of the streets; the fact as to whether or not buildings or open lots are on the corners where an accident is said to have occurred, in order that he may intelligently discuss the matter with the witness. Nothing puts an investigator to so great a disadvantage as a lack of knowledge of the physical features surrounding an accident.

What has been said with reference to vehicular traffic holds true with reference to accidents to pedestrians, and, like passenger cases, the points he is to cover are too varied and too rudimentary to admit of discussion here.

FRAUDULENT CLAIMS

The bane of all investigators is the unreported accident. A suspicion that the claim is fraudulent and has no real basis in fact, and, on the other hand, doubting the statement of the employee to the effect that he knows nothing of the alleged affair, the investigator is often catching at straws in the hope that he may secure a clew that will lead to a satisfactory solution of the irreconcilable stories. Here the ingenuity of the investigator is called into play. It is often helpful in this class of cases to take the deposition of plaintiff if the matter be in suit, and go carefully into plaintiff's history. In this way much valuable information may be obtained, and leads secured, which otherwise would be impossible of ascertainment. He must make a thorough investigation of claimant among employers, neighbors, and those who have had an opportunity to observe and know the actions of the claimant for a period antedating the alleged accident. What has been his or her standing in the community; is he occupying a moral plane that is above the suspicion of attempting to foist upon the street railway company a claim for damages which grew out of injuries received, in fact, in an entirely different manner; has the physician in attendance in times past been connected with similar unreported cases, and if so, to what extent; have other members of the family or close friends been the recipient of money paid in settlement of damage claims; does the presence of the corroborating witness, if one be furnished, check up with his movements on the day in question? All these, and many other methods, may be resorted to by the investigator before the claim finally, unless satisfactorily proved to be bona fide, finds its way into the hands of the secret service bureau.

In cases where the objective evidence of the injury has disappeared at the time of making claim, and where the physical evidence does not seem to warrant the seriousness of the claim presented, then there arises another important phase of an investigation—the extent of the disability; the permanency of the injury, if any; and the damage the claimant will suffer by reason thereof.

In many jurisdictions we are confronted with what is known as the "scintilla rule," and it therefore follows that most personal injury cases in these jurisdictions are submitted to the jury for their determination, and the sympathetic jury, running true to form, immediately loses sight of all other evidence except that pertaining to the physical condition of the plaintiff. It, therefore, becomes of the utmost importance that all the evidence possible bearing upon the plaintiff's physical condition, both before and after the alleged accident, be secured. Of course, in the defense of these cases we may call to the witness stand high-priced medical experts to testify as to their findings in the hope that we may show to the jury the exaggeration that is being attempted, but in the jurisdiction from which I come the money might better be spent in paying the judgment. Experts today can usually be secured on either side of a case; those, on the one hand, finding everything, and on the other nothing. And while this may be aside, it will be conceded by all that until such time arrives as the court appoints an impartial examiner, our medical expert testimony is more or less a farce. Were I preparing a case for trial—one, for instance, of a woman who claimed some serious injury, the objective evidences of which were negative, I would feel more assured of satisfying our counsel were I able to present in court the testimony of neighbors who had seen her on occasions doing things which would seem preposterous in view of her claimed disability.

In all cases where there is a suspicion that the accident under investigation was not the cause of the physical disability alleged, there should be a careful inquiry made concerning the claimant's actions prior to its occurrence.

It is true, of course, that where one case is uncovered and the fraud shown, many others go undetected. But this fact should only inspire an investigator to greater efforts. His task is no sinecure. It is an easy matter, indeed, to deal with a case where the injury is conceded and the facts surrounding it clean cut, but the ones which require the real effort, brains and ingenuity are those shadowy, unreported cases where not only is the question of the occurrence of the accident in doubt but also the injury alleged is more or less fake.

SIGNED STATEMENTS CARRY LITTLE WEIGHT

How should the investigator best preserve his evidence? Dictated interviews are not to be depended upon. Signed statements should always be secured in every instance where they can be taken, using as nearly as possible the language of the witness. Many a signed statement has been held up to ridicule before a jury and successfully argued out of the case by an attorney's contrasting the language therein with the apparent intellectual endowments of the witness.

After an investigation is completed and before filing it away it should be arranged in logical order; the statement of the claimant coming first, those of the witnesses next, and following should be the evidence bearing upon the physical condition of the claimant, together with the medical evidence. A well-ordered and arranged investigation is appreciated by all who are called upon to consult it, from the adjuster to the trial attorney. A brief summary of what the investigation shows may be made up and filed with the papers to show at a glance the procedure followed.

Method of Handling Accidents and Claims*

The Good Response to Requests from Witnesses for Written Statements Has Caused the Adoption on the Ohio Traction Company of the Letter Plan of Investigation as Against the Personal

By Walter E. Robinson
Claim agent, Ohio Traction Company, Cincinnati, Ohio.

In considering the organization of claims departments I am convinced of a marked tendency to overman them. The result of this is increased cost and decreased efficiency by overlapping of duties, duplication of effort, lack of interest due to uncertain responsibility, indecision, confusion, unnecessary friction, waste and a generally unfavorable comparison between the cost of maintenance and the accomplishments of the department. From the standpoint of economy and effectiveness, the foregoing reasons have caused me to operate with a comparatively small force, and I believe effectively.

Witness' Statement Versus Investigation

We are not influenced nearly so much by the number of witnesses or the length of an investigator's report as we are by the quality of the investigation. A lot of time spent on an investigation does not necessarily mean that the work is well done, nor does a maze of collateral matters covered add any value to it. I would rather have a two-line description of an accident from a witness in his own handwriting and over his own signature, than to have a two-page account prepared for him by an agent of the company. The former is not open to the same line of attack to which the latter is often subjected. No explanations are required, or necessary, of the circumstances under which the statement was obtained. We can not be charged with giving the witness no opportunity to read his statement before signing it, or with adding anything to it after it was signed. It is the witness' own document, in his own language, expressed without suggestion or interference. It is the witness' state of mind that we want, and if his attitude is friendly, he will defend his views in a way that will carry greater weight than he can if his description is prepared for him. Many embarrassing situations are thus eliminated.

W. E. ROBINSON

These are some of the considerations, and taken with the further fact that a very large percentage of our witness letters are returned, answered satisfactorily, argues strongly for the letter plan of investigation as against the personal, and has caused me to continue with its use as originally adopted.

The Disposition of Claims

The final disposition of a claim, which consists of making a settlement, rejecting a claim or a law suit, is the one which should interest our management the most because it measures the success of our organization, and has as much or more to do in establishing the standard of the entire company in its public relations, and holding within reasonable proportions the operating costs of the property, as any activity in which any of its departments are engaged.

The influence exerted and the atmosphere emanating from the claim department are responsible, in many instances, for the esteem in which the company is held by the public, and reflect themselves in the jury room by the verdicts rendered and in the amounts carried by the verdicts. It also manifests itself in the feeling that is created in rejecting claims, and is shown in the litigation that ensues after we have declined to give favorable consideration to a claim.

I think it requires greater skill to reject a claim and bring a claimant to your point of view than it does to settle a claim even at a greatly reduced figure from the original demand. I do not hesitate to reject a claim through any fear of its effect on possible future demands or relations, nor is the amount involved any incentive. I have no patience with the oft-repeated statement, "That we must buy our peace with the public," and if I were confronted with that kind of a situation, I surely would not pay the price. In the first place, I do not believe the necessity exists, and if it did, I would certainly see that it was not due to conditions or performances of the claim department, past, present or future.

A well-considered claim, rejected for sound reasons and our position firmly adhered to, will make friends for the company. If it is our intention to reject a claim, and the claimant is so advised and our reasons are sufficient for the action, do not lead the claimant to believe that you will try to find a way to adjust the matter, even though it has no merit. He will accept your money and justify it by saying that you were either wrong in the beginning, or dishonest with your employer in the end, and the company has suffered a loss in time, money and reputation.

An Inflexible Course

We must have some convictions about our work and stand upon them. First, I do not believe that the value of our service is based on the number of releases we can obtain, nor in undue haste in obtaining them. Property damage does not increase with age. Personal injury claims depend on a variety of conditions and circumstances under which a settlement is made.

I prefer to discourage the practice of indiscriminate claim making, and will not allow myself to be placed at a disadvantage while endeavoring to make a settlement.

The company provides offices where our business is conducted, and all matters pertaining to that business are transacted in the offices. Whatever ammunition we have on an accident or claim is there and can be used to a better advantage on our own ground.

I am opposed to hunting prospects, or soliciting new business in our line. It will come without seeking it. I think it is inadvisable to visit the scene of an accident of any kind for the purpose of making immediate settlements. We never send the surgeons to the scene, and rarely to see claimants at their homes. I have never done so, and could not sanction the practice at this stage of our experience.

I am opposed to the policy of adjusting claims outside the office, and under no circumstances do we attempt to do so. I believe the energy expended in this way is misdirected and misapplied, and is one of the causes of the ever-increasing demands on us. It has produced countless impostors, and has been the occasion for the reckless expenditure of enormous amounts, and if a remedy be not found, it will result in further and unnecessary hardships on the property.

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*Abstract of paper presented at the annual convention of the American Electric Railway Claims Association, Atlantic City, N. J., Oct. 3-6, 1921.

Constructive Arguments as Opposed to Destructive Contentions in Accident Adjustments*

An Experienced Claims Attorney Presents in Detail a Method of Adjusting the Every-Day Problems in the Operation of the Claims Department—This Paper Gave Rise to an Extended Discussion at the Convention

By L. H. Butterworth
Claims Attorney Boston (Mass.) Elevated Railway

WE hear much these days about the "psychology of salesmanship." Now it should be carefully borne in mind that the claims man is not a salesman but a buyer—a veritable "purchasing agent"—at least in the case of the adjuster. The investigator, on the other hand, it would seem, cannot be classed as a purchaser, for he seeks to obtain something—viz., evidence—without, of course, being able to give any "quid pro quo." The adjuster, however, can, and does, make a definite money proposition for what he seeks, namely, a release, but he still differs from the ordinary buyer in that the object of his bid has no liquidated or fixed market value, as do most of the commodities bought by the company's regular purchasing agent. In determining what value would be placed upon this "commodity," *i.e.*, claim, by the final appraisers therein lies the province of the claims agent, and the purchase of the same at a favorable discount is then his object.

If, however, there is a "psychology of salesmanship"—and of this there can be little doubt—then the converse of the proposition is true and there must be a "psychology of buying," *i.e.*, a creation of influences or mental reactions and processes in the brain of the "seller" by suggestion and argument on the part of the "buyer."

Many of the difficulties and contentions with which the claims man is confronted may be anticipated and therefore forestalled by remarks or comments apparently merely incidental to the interview, but designed to produce a definite effect on the mind of the claimant or witness. For the sake of convenience this may be described as the "negative method" of procedure, *i.e.*, the inhibition or repression of a contra opinion or state of mind on the claimant's part, before the same has been openly expressed or formulated. On the other hand, the claimant may surprise by some unusual or unexpected contention or objection, to meet and overcome which an entirely different process must be employed and recourse to affirmative argument had. This we may term the "positive method."

Let us now proceed to apply these two methods to our specific cases.

No. 1. *Refusal of claimant or witness to give signed statement*: This, unquestionably, is the obstacle most commonly met by the claims man and, therefore, one which he should be prepared to inhibit or check by anticipation. Applying our so-called "negative method" it would be well for the claims man to preface his interview with some such remarks as these: that he had called to obtain the story of the accident in the witness' or claimant's own words as nearly as possible; that he therefore desired to write it down in his or her presence and to submit it for approval to insure the correctness of the statement. Having completed the written statement the claims man should then hand it to the person interviewed with substantially this remark: "Now, in order that I may lay this before the company's officials as the true and complete recital or description of your claim or testimony, please read the same and call my attention to any errors, omissions or changes you wish made, then sign your name to the statement, so that I can show that I have correctly reported your version of the affair."

L. H. BUTTERWORTH

If, as frequently happens, the person shows an unwillingness to comply with this request or flatly "declines to sign anything," then the claims men must have recourse to other tactics and bring into play the so-called "positive method," which is nothing short of marshaling all the reasons and arguments at his command until the desired result is obtained. It may be helpful to remind the obdurate one that his claim will be looked upon with suspicion if it appears that he was unwilling to dignify it with his signature, or in the case of a witness, that his testimony will have less weight in exonerating an innocent conductor or motorman if he refuses to give it the stamp of his personal approval. Then again, in case of both claimant and witness, it may smooth over the objection to state that it is a matter of first importance and clearly to their own advantage to make a written and signed statement at the earliest possible moment and before the facts are forgotten, for a permanent record of their knowledge of the matter is thus made and they are thereby relieved of the necessity of charging their minds with the details of the same; the copy (which should always be given to claimant) being a source from which they can at all times refresh their recollection.

No. 2. *Refusal to permit medical examination*: This, at least in the writer's experience, is the least frequent obstacle in claims work. A refusal to allow a medical examination should never be anticipated, but consent to same always assumed, and honest surprise and astonishment expressed when such consent is withheld. In those few instances, however, where refusal is made, the claim agent should decline summarily to entertain the claim any further, and should inform the claimant that the latter can hardly hope to be paid money for something which he refuses to show. This should be sufficient to bring the objector to terms, and in case an attorney is handling the claim a proposal to comment before the court or jury upon his refusal to allow medical examination may properly be made.

No. 3. *Refusal of reasonable settlement without the advice of an attorney, or a threat to employ a "shyster" or a professional negligence attorney*: Whether such a difficulty should be anticipated and hence sought to be banished from the claimant's mind is a matter of considerable doubt. It may do no harm for the adjuster to make some casual remark to the effect that "there is no need of incurring any unnecessary legal expense in this matter, as we can probably fix it up satisfactorily between ourselves," but, on the whole, it would seem wiser to assume the defensive rather than the offensive in this particular phase of the claim man's work. If the attack comes in the form indicated, *i.e.*, expression of a desire for an attorney's advice, it may be promptly met by a recital of the well-known disadvantages of such a course—viz., the additional expense in the way of lawyer's fees, probably resulting in a net loss to the claimant; the fact that with an attorney in the case any payment is made to the attorney and not to the claimant; the delay caused by negotiations between the company and attorney and, in the event of a trial, the year or two which must elapse before the cause can be heard and the heavy expense incident thereto. The adjuster should then show by contrast the advantages of a direct immediate settlement, entailing no delay and incurring no outside expenditures.

If the opposition takes the form of "a threat to employ a 'shyster' attorney," further helpful arguments will immediately suggest themselves—the improper fee and other advantages which an attorney of low standing may take—the probability that the company will decline to have any dealings whatsoever with such an attorney—in other words, that the claim will be greatly weakened and prejudiced by such a course, if indeed not entirely lost.

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*Abstract of paper presented at the annual convention of the American Electric Railway Claims Association, Atlantic City, N. J., Oct. 3-6, 1921.

No. 4. *Refusal of claimant to disclose names of witnesses or attending doctor*: This attitude on the claimant's part is closely akin to that suggested in No. 2, and hence calls for a similar line of argument to that therein employed, to wit—that in order for the adjuster to buy such a claim, we must have the fullest information relative to its merits both as to liability and injury, and in no way can he obtain this without a complete exhibit of the "commodity" offered for sale. The refusal to give the doctor's name is so unusual and obviously unfair to the "buyer" (adjuster) that a change of attitude or, psychologically speaking, a "reversal of the mental condition" ought not to be a matter of much difficulty.

The unwillingness to disclose witnesses' names should be met by a statement that their testimony, if favorable to claimant, will greatly increase the chances of obtaining a speedy and reasonable settlement with the company. If this fails to impress the adjuster or investigator may offer to interview such witnesses only in the presence of the claimant or even to accept signed statements from them. In every way he should endeavor to impress upon the claimant that his chief concern is to obtain information as to the facts and is not in any sense an attempt or desire to take any advantage of the claimant by a garbled or distorted report of what such witnesses may say.

The "negative method" is not desirable here, but the moment there are indications that such information is to be withheld, then the investigator should train the big guns of his "positive method" battery upon the objective sought and let go his "broadsides" until the enemy is won over.

No. 5. *Request for company's witnesses*; No. 6. *Request by claimant for copy of company's report of occurrences*: At the outset and at the risk of being termed revolutionary I am going to venture the opinion that, in the long run, these requests are not such destructive contentions after all. Of course, I do not advocate that such information should be handed out broadcast and as a matter of course whenever a request for the same is made, but I do contend that in many cases it may be done without prejudice to the company's interests.

To get the progressive trend of modern thought on this subject we need only look at recent legislation in certain jurisdictions, notably Massachusetts, where by means of interrogatories a defendant may, at the discretion of the presiding justice, be ordered to furnish the plaintiff the names of witnesses to the accident. We all know, furthermore, that the car crews' report of an accident is competent and admissible in evidence at the trial of the action if the plaintiff's attorney has the courage to ask for it.

The fact that both the above rights or privileges are made use of so seldom by plaintiffs is, to my mind, very significant in showing that not much advantage is derived therefrom.

Before suggesting what the "outside" claims man should do or say when confronted with these requests, let us consider for a moment the mental state of the claimant or his motives for making such a demand. He must desire this information for one or more of the following reasons: (a) because he hopes or expects the witnesses sought will corroborate his story of the accident and thereby strengthen his claim, or (b) because he wishes to find out how strong the company's case is, or (c) because he thinks he may be able to influence or change any testimony unfavorable to him. If, now, we have a case where the witnesses are numerous and very favorable to the company a disclosure of them will (a) blast the claimant's hopes and aspirations, or (b) will fully satisfy his thirst for knowledge and (c) he is welcome to any crumb of comfort he may derive from the remote chance of being able to affect or change their evidence. Certainly no harm has been done to the company and the only logical result of such a disclosure is that the claimant's own opinion of the value of his case has been appreciably lessened. The writer has frequently followed such a course in discussing claims or suits with either claimants or their attorneys.

On the other hand, where such a disclosure will reveal weakness instead of strength, of course, very practical objections at once arise against making known the witnesses or giving a copy of the report. The best way to meet this difficulty is not to meet it at all but to go around it by adjusting the claim for the best figure possible.

If the outside adjuster or investigator meets with these requests for witnesses or a copy of the accident report, his reply should be that he has not such information with him but that the same may probably be had by calling at the company's claim department. His superiors can then exercise their discretion as to the wisdom of granting such requests. If it be contended by the claimant that his request for the company's witnesses is merely the converse of the company's request for his witnesses, it may be pointed out that such is not the case at all and that such a conclusion is wholly illogical. The company desires the claimant's witnesses simply for the purpose of checking up or establishing the accuracy of the various allegations of the claim which the claimant has presented; whereas the claimant himself is presumed to know the facts and to have satisfied himself of the correctness and the justice of his claim before presenting same for payment and should not, therefore, call upon the company (the alleged "debtor") for possible helps in proving the "bill." In general, the adjuster should remind the claimant that the principles of business practice and the rules of law govern in the handling of claims and that the burden is still on the claimant to establish the company's negligence, even if in some jurisdictions his due care is now presumed.

No. 7. *Request that claim department repair damaged property*: In certain cases such as broken windows or torn clothing such a request can sometimes be granted to the company's benefit, inasmuch as it possesses the men and facilities for doing the job at a reduced cost or, in the case of damaged clothing, the knowledge where repairs may be most skillfully and economically made.

It is assumed, however, that this topic refers more particularly to repairs of a mechanical nature, such as are necessitated by damage to vehicles. In such cases, it is not desirable from either the standpoint of the company or the claimant to grant the request. The company's representative should advise the claimant that such a practice is unsatisfactory to both sides in that the company's business is the transportation of passengers and that its mechanical department is devoted solely to the movement and upkeep of street cars; that it maintains no general automobile or wagon repair shop, and even if it did, it would still be unwise to undertake the repair work in question because there might be a perfectly natural tendency on the company's part to discover the least amount of damage attributable to the accident and the result would be a job not satisfactory to the claimant. The adjuster might further very frankly admit that the company did not care to assume the risk of a new liability in case the repairs were unskillfully or negligently made.

If the claimant then suggests that the damaged property be sent by the company to some general garage or repair shop the adjuster may point out what is very likely the strongest argument of all, *i.e.*, that it is literally impossible for the company to spend the time and money necessary to attend to the details of arranging for such repair work. He should then explain to the owner of the damaged property that by far the more satisfactory course for all parties is for the claimant to arrange for the repairing of the vehicle at such shop as he may elect, having first given the company's expert an opportunity to inspect the damaged property. Then when the work is completed the various items may be checked up and compared with the estimate of the company's representative and if no serious variances exist a settlement may be easily and promptly had. The foregoing, of course, is predicated upon the assumption that we are dealing with a "liability" case.

No. 8. *Allegation that unfair advantage is taken of claimant:* This contention is one which the adjuster may largely dispel by his very personality and the mode and tone of speech in which he approaches the claimant. A sympathetic, conciliatory, unbelligerent manner should go far toward inhibiting such an idea in the claimant's mind, or, for that matter, in the mind of any other person. In fact, here is a golden opportunity for the exercise of our "negative method" of procedure, and the experienced and skillful claims man will take care that he create an atmosphere of the square deal before he reaches the dollars and cents stage of the proceedings. If, however, in spite of all his efforts and skill in this direction, he is met by the allegation that it is unfair to the claimant to ask for an immediate release or for a release for such an amount as offered, the adjuster should then employ all the affirmative arguments at his command and point out, for instance, that he is not seeking to rush the claimant into a hurried or hastily considered settlement, but that experience has shown that fairly prompt adjustments are the best medicine; that his offer is based upon the "fair market value" for the injury and liability in question, illustrating his point by citation of similar cases; that the very fact of his being sent to see the claimant shows an attitude on the company's part to do justice and make reparation for the injury done; that a large public service corporation such as the adjuster represents is as dependent for its success upon the good will and opinion of its patrons as any private business concern and, therefore, it does not desire and could not wisely attempt to deal unfairly in the adjustments of its accidents.

No. 9. *Contention that any person injured in car accident is entitled to damages:* This is one of the commonest fallacies which we meet in dealing with the riding public, and occasionally even an attorney seems to labor under the delusion that a passenger virtually receives a policy of insurance when he sets foot on one of the company's cars. Nothing, however, is further from the truth, and whenever an adjuster is confronted with this time-worn contention he cannot do better than meet it in the language of the courts. For years, and in countless decisions, judges have stated, in substance, that the carrier of passengers is not an insurer although it owes its patrons a very high degree of care, which has been further defined as the "highest degree of care consistent with a practical operation of the company's business."

In proportion as this contention of an insurer's liability is one of the commonest, so too is it one of the easiest to overcome and banish when dealing with an intelligent claimant. In the case of a stupid or stubborn one the adjuster must draw upon his inexhaustible stock of patience and by simple every-day occurrences illustrate his point and show the unreasonableness and unfairness of asking the company to pay for damages which it did not cause.

No. 10. *Request for adjuster to make frequent return calls:* Whatever motive actuates a claimant in making such a request, the result of granting it is undesirable from the company's standpoint, because it consumes time which might better be devoted to other and newer cases. While a quick settlement is best, nevertheless, the adjuster should not press the claimant too zealously but should show willingness to call again in a few days after the diagnosis of the attending physician, or the opinion of the company's medical examiner has been obtained. The adjuster should refuse, however, to keep calling at frequent intervals and should tell the claimant that such a course will serve no useful purpose and also that the convalescence and recovery will be more rapid and permanent by removing the mental or "psychological" factor of worriment by an early adjustment of the claim.

No. 11. *Refusal to call at claim department offices for discussion:* This contention or obstacle is not of sufficient importance for the adjuster to waste any time in trying to overcome it. There may be some good reason for such a refusal, as for instance, physical infirmity or lack of time, but even if caused by downright stubbornness or unreasonableness no serious thought or time should be sacrificed in combating it. "If the mountain won't come to Mahomet let Mahomet go to the mountain."

No. 12. *That the company is liable or it would not call upon claimant:* This thought, although perhaps not openly expressed, may very naturally arise in the mind of the injured party when a claims adjuster makes him an unsolicited call. It would seem wise, therefore, at least in cases of debatable liability, for the adjuster to employ the "negative method" and introduce himself more in the character of an investigator than an adjuster and by means of his opening questions create the impression that there is doubt in the minds of the company's officials as to their liability for the accident and hence call upon the injured person to ascertain his version of the occurrence. In the case of absolute liability such as car collisions, derailments and the like there is little occasion for such a procedure and the adjuster may account for his voluntary visit by the perfectly sincere statement that he desires to learn whether the person was injured and if so, the extent of such injury. They can then get down to the real business of settling the claim without further preliminaries.

Thus far it will be seen that we have been working along the lines of the "negative method." If now the claimant becomes belligerent and asserts that the adjuster would not have called upon him had the company not believed itself liable for the accident in question—then the style of procedure shifts to the "positive method." It is then up to the adjuster to enlighten the claimant as fluently and thoroughly as possible as to the principles and advantages of compromise and to inform him that corporations and also individuals frequently make small payments even in cases where it is definitely settled that there can be no recovery at law; that such a course is taken not only to assist the injured by lightening their financial loss but also as a matter of sound business policy on the part of the company.

No. 13. *That settlement with driver for injury indicates liability for property damage:* This contention is one to be anticipated and denied at the very outset, and presents an excellent opportunity for an application of our "negative method" of procedure. In other words, such an idea existing in the mind of the property owner must be aborted by a denial or negation of its logical soundness. The adjuster, if he is endeavoring to effect a compromise, should commence the interview by differentiating the reasons and motives which make it expedient for the company to desire the personal injury claim settled and yet to have no particular concern relative to the outcome of the property part of said accident. The argument is this—that the driver's claim presents a case of personal injury, *i.e.*, hurt done a human being, the measure of damages for which may be estimated anywhere between nothing and thousands of dollars. The property loss, on the other hand, presents merely a claim for a fairly definite, practically liquidated amount of damage to a piece of personal property. There may be some minor differences or disputes between the parties, as to the market value before and after the accident and as to reasonableness of repair bills, but these are trivial when compared with damages in the personal injury case and the maximum amount of damage can be almost mathematically ascertained. Hence the company's treasury is not faced with a claim whose value is undeterminable and which may possess great potentialities.

This line of reasoning, it will be noted, closely resembles the argument to be used in dealing with No. 12, and seems too simple to need further elaboration. Many others of equal or greater merit will doubtless suggest themselves to members of this association. The particular environment, social and financial status, local customs and laws, all these are factors of the utmost importance in the application of psychological principles, for to be of any real assistance to us this psychology must be of the so-called *practical* or *applied* kind, as contrasted with *pure* psychology. In short, the successful claim agent is, after all, merely a shrewd trader or business man, to whom, in plain English, the greatest assets are a fairly fluent and persuasive tongue coupled with a large amount of good, hard common sense.

History and Comments on the Third Rail System*

Some of the Interesting Features of and Experiences on the Third Rail Systems of the Pacific Coast

IN CONSIDERING the history of the third rail, we are not confronted with a problem of ancient history. In the eighties there were several feeble attempts at using a rail on the same plane as the running rail instead of the overhead trolley. The first successful application, however, was on the Intramural Railway around the World's Fair Grounds in Chicago in 1893.

Following this, the next installations of importance were the elevated roads of Chicago. The Metropolitan on the West Side was the first one, the others being converted from steam to electric using the third rail. From this it was a mere matter of a few years and all the elevated roads in New York City and Boston were converted to this system.

Then in quick succession followed several of the terminal electrifications in the East, all using the third rail where the voltage did not exceed 600. These installations are still going on east of the Rocky Mountains. This story, however, deals more particularly with the installation on what is now the Northwestern Pacific Railroad, Marin County, Cal.

To one of the early pioneers in the electrical field in California is due the credit for the electrification of the interurban section of the old North Pacific Coast Railroad. John Martin purchased the North Pacific Coast Railroad, then a narrow gage road from Sausalito to Cazadero and running over the hills from San Anselmo to San Rafael and down to San Quentin Point, and made the electrified section broad gage, still retaining the narrow gage for steam. The present system consists of 6 miles of single track and 15½ miles of double track, or a total of 37 miles of electrified track, all at 600 volts.

In this state there are three third-rail systems, the Northwestern Pacific and the Sacramento Northern, using the over-running type of construction at 600 volts, and the Central California Traction, using the under-running type at 1,200 volts. The contact rail as used on the Northwestern Pacific is all regular common "T" rail, and nearly all of it is either 60-lb. steel or 50-lb. iron.

In the first installation the rail was supported mainly on a large block of wood spiked to the tie and the contact rail spiked to the block. These were continually breaking off and did not last very long. Then some patent granite blocks were tried. These were put in at the Sausalito terminal and through the Corte Madera tunnel. The leakage over them was excessive and the aura at night was at times brilliant. It was quickly decided that the object to be obtained was a support for the contact rail and not a means of illumination.

At that time the present style of support block which has proved very satisfactory was designed and put into service. Every sixth tie in the track is 1 ft. longer than the standard tie. On this extra length the support for the contact rail is placed. This support consists of a redwood block 5 in. square and 6½ or 7 in long. The length depends on the size of the rail in the track. This block is treated with two coats of insulating paint by dipping. There is a ⅜-in. screw bolt at the base holding to small angle irons, which in turn are lagged to the tie. On top of the block is placed a cast-iron cap upon which the rail rests. The cap is so constructed as to form an apron over the block and give a space of nearly 2 in. on the block that is always dry even in the worst rainstorm. Of course, this does not exist when flood water comes up over the track and even over the contact rail. This cast-iron cap has a channel in which the rail rests. The rail is not clamped or fastened to the block in any way, but is free to move with the expansion and contraction. The contact rail has tried to crawl over the right-of-way at times, but it generally landed on the running rail and the result was a shutdown. When this buckling has occurred, it is simply a case of breaking a joint at this place, allowing the rail to straighten out, dropping the overlapped end to allow space travel of the collecting shoe on the cars. To overcome this trouble about twice a year men go over the line and hammer the joints and pour oil around the angle bars and over a large proportion of the support block caps. When this has been done, the buckling feature has been eliminated. As an illustration of how successful this is, we have several sections of 3,000 ft. and one section of over 4,000 ft. of continuous power rail.

At road crossings and intervals in front of stations the rail is open and the ends protected by approach blocks. These blocks are pieces of rail equal in cross-section to the contact rail but with one end heated and hammered, thus allowing the contact shoes on the cars to ride up onto the rail easily. At these openings there is constructed an underground box with at least one 1,000,000 circ.mil cable in it, the ends of which are soldered to the end of the contact rail.

These undergrounds, as we call them, are constructed of 1-in. redwood and are made 4 in. square inside. The cable is supported in the box clear of the wood by porcelain cleats every 2 ft. The box is then filled with an asphaltum insulating pitch. Properly installed, this type of box has proved very satisfactory and has the most excellent moisture resisting qualities.

In the original installation a feeder was placed in the web of the rail from Sausalito to San Anselmo with the exception of the section through the Corte Madera tunnel. This feeder proved very unsatisfactory, for it was but a short time after its installation that the sleeve joints began to loosen up. Even after the sleeve and rod were drilled through and aluminum pins driven in, these were sheared off.

The experiences with this rod were very interesting. At openings where the rod ended it was necessary to use a long brass sleeve for connections. In one end of the sleeve was soldered the rod, using only pure block tin. In the other end was soldered a short piece of copper cable using half and half solder and the cable soldered to the rail. The jumpers were soldered directly to the rod on either side of the sleeve. After they were soldered the joints held and would not give. There were about seventy-five of them put on in the section between Alto and Almonte. Four days later all the jumpers were on the ground, having fallen off of their own weight. Another attempt to solder aluminum has proved futile.

About five years ago there came suddenly a demand for aluminum. All the aluminum feeder was then replaced by a 1,000,000-circ.mil. copper cable and the change was made without expense to the railroad company.

One great advantage in the third-rail construction, both mechanically and financially, is our method of carrying feeders. From Sausalito to Alto Power House, a distance of four and one-half miles, we have two 1,000,000 circ.mil cables on each rail, or four cables in all, and the only additional expense for feeder support is the small iron clamp used to hold the cable in the web of the rail. There are at advantageous points switches so that the system can be sectionalized if necessary and in case of trouble one section can be eliminated entirely. We also carry an overhead jumper on pole line over Corte Madera tunnel, and have switches installed so that the tunnel section alone can be cut out without interference with any other section.

The use of a third-rail system of course can only be justified where, like the Northwestern Pacific, the operations are entirely over private right of way. There have been several cases where people being struck by trains have been thrown against the power rail and burned. There is but one case of human life lost that I can find directly traceable to contact with the third rail.

Our maintenance costs after thirteen years of service show the following averages:

For 1916	$87 per mile
1917	95 per mile
1918	145 per mile

The differences in these costs do not reflect any change in the condition of the rails, but rather a decided change in labor and material cost. At the present time we are maintaining the entire system with a crew of five men, three of whom only devote one-half day to power rail work. This crew also does all track bonding.

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*A paper prepared by the electrical department, Northwestern Pacific Railroad, and read by C. E. Thatch, at a meeting of the Pacific Railroad Club, San Francisco, August 11.

The costs previously given take care of all track bonding. All joints on the running rail are bonded with a 300,000-circ.mil soldered bond with a "T" head, soldered directly to the rail. We admit that we are without doubt cranks on solder. All joints of whatever nature, bonds, feeder cable, cross cables, are soldered direct to the rail, using half and half solder.

The gage of our rail is 26½ in. out from the gage line of track and the top of power rail 6 in. above top of running rail. For total clearance we ask 12 in. above top of running rail, 22 in. out or more. This clears on all classes of equipment. Occasionally there is sent on the road some large furniture car with unusually low truss rods, but this difficulty is overcome by observing the published clearances and also the alertness of car inspectors at Tiburon, where most of such equipment reaches our road.

One of the main difficulties is in the winter from high water. We have had several times when at certain points the water was up over the power rail, but it was fresh water and we were able to keep power on the rail and keep trains moving. When the extreme high tides come in the winter along the shores of Richardson Bay, with a good southwester behind them and the salt water begins to get up around the power rail, operations cease. This condition occurred during one storm in the winter of 1918-1919, and our traffic out of Sausalito was stopped for about three hours during the most severe part of the storm.

Railroad Crossings and Crossing Signs*

Standardization Suggested Along Various Lines to Reduce the Hazard —The Railroads of the Country Are Spending Thousands of Dollars a Year to Protect the Public

By R. S. Messenger
Claim Agent Rochester (N. Y.) & Syracuse Railroad

THE RAILROAD LAW of New York State specifies the type and position of the crossing sign to be installed. This sign is furnished by the railroad company and is set by the highway authorities of the town or municipality in which the crossings are located. This law is a step in the right direction, but I do not believe that the sign is sufficiently conspicuous to be adopted as a standard for all crossings; also there is nothing in the law to prohibit other signs being placed at crossings. You have all approached crossings where there was the usual "Stop, Look and Listen" sign, a sign put up by the State Highway Departments, a sign put up by the local automobile club and last but not least a sign put up by some industrial concern ostensibly as a warning sign but in reality an advertising scheme.

In my opinion, this multiplicity of signs is worse than no sign at all because when the driver of a vehicle approaches a crossing so decorated he tries to read them all and doesn't sense any of them, or, what is more apt to happen, they are taken for advertising. If one conspicuous uniform sign was placed at each crossing and the public seeing that sign could know that it meant one thing, many crossing accidents would be avoided. A uniform standard sign of such size and coloring and so lettered that its meaning cannot be mistaken should be placed at every grade crossing in the country. Such signs should be placed at a uniform distance and far enough from the crossing so that there will be plenty of opportunity to have an automobile under control before reaching the crossing. When such a sign is adopted and placed, it should be *prima facie* evidence of negligence on the part of the driver of a vehicle who is struck and injured at a grade crossing.

The chief safety officer of a large railroad recently told me that he had checked three widely separated crossings to find the number of vehicles going over them in a day and to check the number of drivers of such vehicles who stopped, looked and listened before crossing the railroad tracks. Approximately 7,900 vehicles, of which 98 per cent were automobiles, crossed the three crossings that day, but none of them stopped and less than 5 per cent of the drivers of these vehicles looked or listened before crossing the tracks. The railroads of this country are spending thousands of dollars every year to protect the public at their crossings and to train and educate the motormen and engineers in safe operation, but until the automobiling public shows a disposition to co-operate, we shall continue to have these appalling catastrophies at grade crossings, no matter what type of sign is adopted as standard.

Gates and flagmen are considered by many as the most effective protection for grade crossings, but the expense of maintenance is greater than the electric railways of this country can stand. Aside from the expense I personally know of numerous instances where automobiles have been driven through the gates, and the August number of the *National Safety News* contains an article showing where the Long Island Railroad has been compelled to use telegraph poles in place of the usual type of gates because so many drivers of automobiles had driven through the ordinary gates. This is a pretty good evidence that the fault is not all with the railroads. Pedestrians also are daily disregarding the gates, walking under or around and being struck by approaching cars.

Flagmen are human, and where the human element enters failure sometimes arises, but more often in the case of railroad flagmen than elsewhere, because cripples and old men are placed at crossings as a substitute for a pension. This should not be done, for a flagman to be efficient must be intelligent, active and alert.

There are many automatic signals for crossings such as electrically operated gongs, good at some places but affected by climatic conditions, easily getting out of order or else they ring continually when there is no danger, which leads to their utter disregard.

The old type "Stop, Look and Listen" signs were all right before the advent of automobiles, when the approach to crossings was at the rate of 4 to 8 m.p.h., but in the present day these are not conspicuous enough nor are they seen soon enough to stop a vehicle approaching a crossing at 20 to 50 m.p.h., so today we are advocating a standard crossing sign to be placed at from 300 to 500 ft. on each side of every crossing.

In New York State, and I am informed in many other states, the railroads are compelled to pay for these signs. It does not seem reasonable to require the railroads to furnish or maintain crossing signs to be erected off their right-of-way. This should be a public charge, or at least the cost of the signs should be shared by the public and the signs placed and maintained entirely by the public. As to the maintenance of these railroad crossing signs, I have seen any number of them that have been placed at crossings in New York State within the last year riddled with bullet holes, the enamel knocked off, the sign bent so as to be useless as a warning and in many instances knocked down entirely. Much of this damage is done thoughtlessly by boys, some deliberately by men. The National Safety Council should, through its local councils, start a campaign to educate the public as to the meaning and importance of the standard crossing signs and as to the possible results which may arise from their effacement and destruction.

To the railroad man grade crossings present another problem, which is to make the view for the motorman and driver of approaching vehicles as long and as clear as possible. Here again the railroad meets the opposition of the thoughtless public who own property along the right-of-way. For example, the company with which I am associated has for the past four years sent out men to trim trees and clear the view at all crossings on our road, which is a double track, high speed road, 87 miles long, operated between the cities of Syracuse and Rochester over 117 grade crossings. As foreman of this safety crew we use a motorman who has been in the employ of the company for the past fourteen years. His instructions are to trim all trees, bushes and weeds on the right-of-way which in any way interfere with or obstruct the view of a motorman or the driver of an approaching vehicle; also to trim all trees, etc., adjoining the right-of-way that interfere with or shorten the view, where he can obtain the permission of the owners of such trees or bushes. Here is where the trouble begins. The one idea in the minds of adjoining property owners, particularly near cities and towns, is to grow a hedge or line of trees that will shut off the railroad regardless of the safety of the public at such grade crossings. We have no power to compel the trimming or to prevent the planting of these barriers, but are annually forced to pay out large sums of money for accidents caused by those death traps erected by unthinking people.

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*Abstract of paper presented at the electric railway section of the annual congress of the National Safety Council, Boston, Mass., Sept. 29, 1921.

All railroad grade crossings should have easy approaches, good planking and be so graded that the danger of stalling motors would be eliminated as far as possible. All automobiles should be driven over railroad crossings in intermediate gear to reduce the danger of stalling and thus prevent accidents. Slight inexpensive changes in highways often make dangerous crossings comparatively safe. When a road crosses the track two or three times within a short distance, several crossings can be eliminated by re-locating the highway, especially when state or county highways are being constructed.

Among the safety rules of the road with which I am connected is an order to the motorman that all highway crossings in cities and villages must be approached under such control that a car may be stopped short of any obstacle. Sometime ago at one of these crossings an automobile was pushed by the car between 200 and 300 ft. The motorman was laid off for thirty days. The situation has improved since then, but there again we have the human element, and it is necessary constantly to check up these crossings to see that the order mentioned is obeyed, but who checks up the careless, thoughtless and reckless automobile driver for whose mistakes the railroads are daily made to pay?

Many grade crossing accidents on electric roads, in my opinion, are due to ignorance on the part of the public as to the speed, distance traveled per second and distance in which a large interurban car can be stopped. Not long ago a vehicle was struck at a crossing on one of the roads running out of Syracuse. The following morning the coroner asked the motorman, who was a man of long service, the speed at which the car was traveling when the vehicle was first seen. The motorman's estimate was 40 to 50 m.p.h. "How far away were you from the crossing when you first saw the vehicle?" "About 200 to 250 ft." "How far did you go after you applied your air before stopping?" "About 650 ft." At this reply the coroner said, "That is all I want from you. You should have stopped in less than that distance." After the motorman had left, the claim agent told the coroner that a test was to be made the following day with the same car and motorman at the point of the accident and asked the coroner to be present. A number of tests were made, and the shortest stop according to the coroner's own measurement was 700 ft. The coroner told the claim agent that he wanted to apologize to the motorman as he considered after seeing the test that a wonderful stop had been made at the time of the accident. He also said that he had learned a great deal about the operation of interurban electric cars that he had not before appreciated. That particular coroner is very careful since that experience about placing the blame before he knows all the facts.

My observation has been that the officials in charge of constructing state and county highways pay too little attention to safety features at electric railroad crossings. I know of a number of roads constructed within the past two years where the crossings are diagonal, a good view one way and no view the other for either the public or railroad employees. Cuts have been dug, the grade changed and no attempt made on the part of the highway officials to eliminate the resulting banks from obstructing the view. The railroads, the state and county highway authorities, automobile associations and local safety councils should get together in every state in the Union and adopt some sane, uniform and practical method of road construction in relation to grade crossings.

It is my opinion that the standard crossing sign should be of a color that is most visible in daylight and will most readily reflect light from automobile headlights and even from a dim lantern on a farmer's wagon and that color from my experience should be "traction orange" for the background or field, with "Railroad Crossing" in large black letters. It should be of such size as to compel the notice of passing vehicle drivers, at least 4 ft. x 4 ft., and should be constructed of a material as nearly indestructible as possible. This sign should be located on the right-hand side of the highway on each side of every crossing at a distance of not less than 300 ft. All other signs should be prohibited by law from being placed within 1,500 ft. of such grade crossings.

Some may wonder why "traction orange" has been my choice. The cars of the company with which I am connected were formerly painted a dark green and some Pullman color. One day I heard one of the Public Service Commissioners of New York State say that our cars blended too much with the landscape and should be painted a more visible color. Our company immediately took a car and painted it in panels of several different colors. We found after an exhaustive test that the "traction orange" was visible at a greater distance and reflected light farther than any other color.

"Traction orange" is a shade of yellow. Yellow is the color that is used by railroads as a caution sign. Caution is the thing that must be instilled in the minds of the people approaching railroad crossings. If the public will approach grade crossings with caution there is no danger and, therefore, no need for a red sign. When it becomes a habit with the public to approach grade crossings with caution, the grade crossing problem will be near a solution.

Eject the Grundys*

The Constructive Method of Teaching Safety Methods Is Urged Upon the Railway Industry

By Laura M. Roadifer
("Miss Safety-First")
Philadelphia Rapid Transit Company

IN THIS world problem of preventing needless injury to human life probably no other industry began earlier or worked more persistently than the street railway industry, for the reason that upon its operations the city's economic life depends. With perhaps greater frequency, too, as a result of careful and continuous study of the material causes of accidents, new and better improved safety devices have been put into operation to reduce the mechanical hazards to a minimum. The street railway industry, probably more than any other, is confronted with ever changing conditions involving new dangers and new problems. Contributing largely to these changes is the automobile traffic, which shows such a marked increase every year, affecting some cities more than others, depending largely upon the width of the streets upon which we operate, that it unquestionably has become the greatest menace to safe street car operation.

In my opinion the greatest problem which we have now to solve lies in discovering the best means of inculcating the "preventive spirit" in the minds of the general public, but principally directed to employees, autoists and school children playing in the streets; the latter being the particular phase of this problem to which I have been giving attention with very gratifying results. Numerous methods to effect this "preventive spirit" have been employed, some more successfully than others, but most of us at least until a comparatively recent time have been prone to let our attempts in this direction rest upon the "Better be safe than sorry" type of slogans, which time and usage have robbed of their edge, instead of attempting to arouse active spirit. By arousing a spirit of emulation among the employees, the major tendency for a clear accident record can be created and accentuated. Recognition of careful service ignites the spirit of emulation readily. One motorman of the P. R. T. Company has operated a car for the last twenty years and holds a no accident record. His fellow workers know this is not merely a stroke of luck, but careful application to his duty at all times. A development of overzealousness must be guarded against, however, for an industrial organization must have for its foundation co-operation for continuous mutual benefit, and it is very important that every individual in an organization understand where the mutuality of interest lies.

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*Abstract of address delivered before the electric railway section of the National Safety Council at Boston, Sept. 27, 1921.

Unfortunately the greater number of accidents remaining in the street railway industry depends largely upon the public's failure to comply with the obvious laws of safety, for in this modern day of civilization the instinct of self-preservation is not as keen as in the more primitive ages and safety teaching has become recognized as an essential part of every one's education. It is a state requirement in some parts of the country that safety be taught in all the schools. I take it every one here acts as instructor among either the employees in his organization, the public, or both, but, regardless of the people whom he works among, the first essential is that he should understand human nature well enough to select intelligently a method of approach which will bring the proper mental reaction. Things regarded as educational do not have a strong appeal, generally speaking, for comparatively few of us have a natural thirst for knowledge. If this were so, more men would rise from the ranks into executive positions than really do, if the interest to learn everything possible about one's job were prevalent.

Don't you think, however, that all of us are a little too inclined to regard ourselves as teachers, modifying our name somewhat by calling ourselves safety instructors or directors, but employing the methods used when we went to school, rather than regarding ourselves as salesmen of a product for which we must create a demand? The old style teaching, the kind we had, "won't take" any more, and the modern teacher must apply the arts of the salesman to make his subject appear attractive, whether it is or not, and we must admit that safety is fundamentally unattractive. We sometimes become so terribly impressed with our own importance and take our work so very seriously that we become what I call the "Grundy" type, complaining of the everlasting carelessness of the men, or the unwillingness of our superiors to see the conditions as they really exist, or go about deploring the fact that "some one" around the shop had done some very careless thing and predicting as a consequence that that "some one" was going to get hurt if he weren't more careful, or announcing to some one before his fellow workers that that was the second time he had been caught without his goggles and the next time it was expected that he would be caught without his eyes.

Cheerful thoughts that suggest so many pleasant things. Let us eject the Grundys and adopt the constructive, happy method of teaching or selling safety. Instead of continually telling the people to avoid injury so much of the time let us try more to impress them with the right way to keep safe.

The "constructive" method apparently is the one that sells the goods; why can't it be just as successfully employed in selling safety?

Illinois Association Annual Meeting

Talks on Manufacturer Co-operation, Advertising the Railway and Bus Competition, Followed by Golf Tournament, Make Day of Work and Recreation

WITH an attendance of sixty, the Illinois Electric Railway Association held its annual meeting at the club house of the Aurora (Ill.) Country Club on Oct. 14. President E. M. Walker, general manager Terre Haute (Ind.) Traction & Light Company, presided, and, after rollcall, addressed the members briefly on the current aspects of the business. In speaking of the trials through which the industry has passed, he said that while even now we cannot say with assurance that the storm is over, we can at least see the break in the clouds sufficiently well to give us the feeling that the electric railways are going forward to better days. Conditions improve with the process of liquidation, and liquidation is going on and will go on effectively until the process is complete. Natural movements do not stop midway. We are finding out that our prosperity as a nation depends not so much on the amount of the world's gold supply that we own as on the amount of the home-produced commodities that we sell at a profit to the rest of the world, and until that lesson is fully learned we cannot talk of normalcy as an existing state. Normal times will not come until business is reassured and made to know where it stands with reference to such vital questions as the tariff and taxation and until our constituted governments begin to practice thrift and economy in earnest and make it clear that business properly conducted will not be interfered with as long as it is managed with due regard to the laws.

Continuing, he remarked that at the recent convention of the American Electric Railway Association the keynote seemed to be salesmanship, and to his mind this should ever be the uppermost thought in the electric railway business. When the idea of salesmanship is lost sight of, the idea of doing business at a profit is lost also. All incentive to give good service vanishes and business falls down. The way to sell any product is to make it attractive and as we have only one product to sell and it is such a product as cannot be stored or placed on shelves or in showcases for future use, but on the other hand must be sold out on every trip and a new supply made for the next trip, we must put our best thought and energy into making this product attractive. By this he meant that it should be furnished with the best and most suitable type of equipment at the frequency and with the regularity that the traffic demands, and at a price which the customers are willing to pay and which will return a profit to the operators.

K. A. Simmon, Westinghouse Electric & Manufacturing Company, then addressed the association on what the manufacturers are trying to do to assist in relieving the burdens of the electric railways. Among the examples cited to indicate co-operation of the manufacturers, he mentioned the part they have taken in the general task of educating the public to an understanding of utility problems, the use of space in popular national magazines for the same purpose, the studies made of the field of usefulness of electric transportation and the work of expounding the results before business men's associations and various civic bodies. Of more direct assistance was the effort of the manufacturers to reduce operating and maintenance expenses by cutting down the cost of production of manufactured articles and improving their quality. The safety car, particularly, he thought, was a credit to the manufacturers' aid to the industry as there are now some 5,000 of these cars in operation which, at an average annual saving of $2,000 per car, means a saving to the industry of some $10,000,000 annually. He counseled against any misapprehension as to the replacing of the street car by the trolley bus, saying that there was little possibility of that form of transportation displacing the street car even in a minor way.

John Benham, vice-president International Register Company, called attention to the paper read by E. F. Wickwire at the recent convention at Atlantic City (See ELECTRIC RAILWAY JOURNAL for Oct. 8, page 599), in which it was pointed out that the manufacturers' employees should be made to realize that their bread and butter depends on the wellbeing of the electric railway industry. Mr. Benham said that manufacturers' employees constitute a large number of people who can talk and vote in a way to help correct sentiment and legislation tending against the electric railways. He thought that few manufacturers were taking the trouble to give their employees this angle of their responsibilities to the industry and he emphasized it as a thing which should be done. As for the International Register Company, he said that he would not have an employee in the establishment who was against the utilities.

A paper on "Advertising the Electric Railway," by E. E. Soules, was read by Mr. Helton, Chicago Elevated Railways, in the absence of the author. An abstract of this paper appears elsewhere in this issue.

Luke Grant, publicity manager Chicago Elevated Railways, in discussing Mr. Soules' paper, said that the efforts of the publicity man, no matter how good, fall flat if the operating department does not back him up with good service. Truth in advertising must hold absolutely with any publicity matter gotten out about electric railway service. He pointed out also the great desirability of having all employees thoroughly informed as to the company finances, stating that there are no secrets any more in the electric railway business and the employees should have the information in order to give them proper background for their contact with the public. In one of the publications gotten out for the employees of the elevated railways, a monthly simplified analysis of the operating statement is published and the results have been good. Mr. Grant explained that the publicity work of his company included the monthly publication and distribution of 5,000 copies of the *Safety Bulletin* for the employees, and 50,000 copies of the *Elevated News* and 12,000 copies of the *North Shore Bulletin* for the public.

Discussion on Motor Bus Competition

In his report Secretary R. V. Prather called attention to the bill passed by the Fifty-second General Assembly of Illinois which provides for fees in addition to those required under the motor vehicle law, for the operation of motor buses and motor trucks over improved highways. The fee originally written into this bill as introduced was 1c. per mile for passenger or freight carrier vehicles. In the absence of data to support these fees an amendment was agreed to with the Illinois Automobile Association which provides that ½ cent per mile shall be paid for all vehicles, trailer and semi-trailer used in carrying freight, and one-twentieth of 1 cent per mile for each passenger seat for each vehicle, trailer or semi-trailer used in carrying passengers. The bill requiring the payment of these fees was passed by the Assembly and signed by the Governor. Mr. Prather reported that the Secretary of State is experiencing some difficulty in collecting these fees, and he urged the co-operation of the railway companies in reporting to him the names and addresses and sphere of operation of any bus companies known to them. This will make it possible to check up with the Secretary of State as to the application of this law. He thought it was important to make a showing as to the financial benefits to the State accruing from this act, as an effort will probably be made to repeal it at the next session of the Legislature.

A. M. Farrell, general freight and passenger agent Chicago, Ottawa & Peoria Railway, discussed various aspects of the competitive situation in Illinois at some length, pointing out particularly the requirement of the law that a bus company or freight trucking company operating on public highways must secure a certificate of convenience and necessity from the Illinois Commerce Commission before it can begin operation. He summarized the requirements set forth in general order No. 68 of the commission for applicants desiring to operate motor bus or motor truck lines, as follows:

Must be incorporated under Illinois laws.

Must notify a utility with which they will be in competition.

Must file notice with every municipality, county or township into or through which applicant proposes to operate.

Must give notice, three weeks before hearing before commission, by publishing in not less than 3-in. space once each week for two successive weeks, in a newspaper published in or of general circulation in every city, town or community affected, but when cities are more than 10,000 population such notice must be published twice each week in two papers. The commission prescribes the wording to use in such notices.

Must secure authority from cities, villages or towns to operate upon the streets of any municipality and file a certified copy of same at hearing before commission.

Must engage chauffeurs only in accordance with motor vehicle law of Illinois and a certified copy of license issued to each chauffeur must be filed with the commission. Chauffeurs must be twenty-one years of age or older and have two years' experience.

Must produce, at hearing, information as to weight of vehicles.

Must make quarterly reports to the commission, on the first of January, April, July and October, showing condition of each vehicle, cost of operation, statement of income, statement showing financial assets and liabilities, and claims pending, showing amounts involved and character of claim.

Must make immediate report to commission of any accident, causing loss of life or injury to any person.

Must make quarterly report showing number and make of motor vehicles, seating and tonnage capacity thereof. No such vehicles shall be operated over any other route, or at any other than schedule time, so as to interfere with the operation on schedule time over the specified route, without express permission of the commission, unless the established route is blocked or impassable.

Must file time-table showing time of arrival and departure at each point. No change may be made in schedule until after five days' notice to the commission. Must file tariff showing charges, in accordance with commission's instructions.

Must operate cars without interruption unless authorized to the contrary by the commission. Unless they comply strictly with the terms of commission orders the certificate of convenience and necessity is declared cancelled.

Must continue to furnish service until the commission holds a hearing (under the same rules of procedure as when certificate of convenience was issued) and issues an order cancelling their certificate.

Must file on or before hearing before the commission, and also before operating any vehicle, a sworn statement of ability to pay damages resulting from accidents for which they may be held liable, or file with the commission securities, indemnities or bond protecting the traveling public. Section 55A of Ill. C. C. Laws places the amount of $10,000 on each vehicle.

Must not operate any vehicle until every provision of this order is complied with and evidence thereof has been submitted to the commission.

Must stop at every grade crossing.

Must forfeit all rights if vehicles are not operated within ninety days after certificate has been granted.

Failure of any corporation to comply with each and every provision of the commission's order shall be full and sufficient cause to cancel and set aside any certificate of convenience and necessity granted.

Continuing, Mr. Farrell spoke of a certificate which had been issued to a bus company to operate in competition with his company between LaSalle, Oglesby, and Starved Rock, Ill. The granting of this certificate was opposed by the railway, but the commission ruled that the bus company was entitled to the certificate by reason of the geographical location of the point served. The route of the bus company is a direct one and somewhat shorter than that of the electric line. The traffic of the interurban is handled to Starved Rock Station, from which passengers walk about a quarter of a mile to the Illinois River, and there board a ferry boat which conveys them to the south bank to Starved Rock proper. After failing to prevent the operation of the bus line, the railway arranged with the ferry company for a sale of joint tickets at a very low round trip rate. The bus company charged 75c. for the round trip between LaSalle and Starved Rock, and when the railway put in a through ticket rate, the former was forced to reduce the charge to 50 cents. Additional service was also put on the electric line and quite a good deal of business was drawn away from the bus company. This method of meeting the competition with cut rates and frequent, good service is to be continued next year, even making further reductions if necessary.

F. E. Fisher, general manager Chicago, Ottawa & Peoria Railway, called attention to a serious defect in the Illinois law governing highway common carriers which hinges on one word. The law describes the companies affected as those engaged in the business of picking up passengers "indiscriminately." For this reason, he said that many buses which are doing very great harm to the electric railways are without the jurisdiction of this law. He explained that some bus operators contract with coal mining companies, school districts, manufacturers, etc., to haul the employees to and from work or children to and from school. Having once contracted to haul certain people, they do not come under the definition of indiscriminate handling of passengers and have therefore been able to operate without securing a permit from the commission. During the off hours, these bus people contract to handle baseball crowds and miscellaneous gatherings so that they are kept occupied a good deal of the time in a way that forms very serious competition for the electric railway companies. Mr. Fisher said that as a result of the various bus competition, the earnings of his company have shrunk from $10,000 to $20,000 a month and that unless some way is found to put them out of business, the interurban will have to cease operation before many years. He explained further what Mr. Farrell had said about the competitive bus line operating to Starved Rock. This line runs over a fine concrete road all the way and by virtue of crossing a bridge and carrying the passengers directly to Starved Rock, it is able to give a quicker, better service than the electric railways can possibly furnish. In view of this, Mr. Fisher could see no way to compete, except to cut rates to such a point as to starve the Starved Rock buses.

The matter of correcting the fault ntroduced by the word "indiscriminate" is to receive the immediate attention of the legislative committee of the association.

ELECTION OF OFFICERS

As the concluding business of the annual meeting, the following officers were elected for the ensuing year:

President, W. L. Arnold, secretary and treasurer Elgin & Belvidere Electric Company, 105 South LaSalle Street, Chicago; first vice-president, A. D. Mackie, Springfield, Ill.; second vice-president, R. A. Moore, Joliet, Ill. Executive committee, E. M. Walker, Terre Haute, Ind., chairman; D. E. Parsons, East St. Louis, and H. E. Chubbuck, Peoria, Ill.

After luncheon at the Country Club, the annual eighteen-hole medal handicap golf tournament was played, Luke Grant carrying away the president's cup. The Aurora, Elgin & Chicago Railroad provided a special train from Chicago to Aurora and automobiles from Aurora to the Country Club for the convenience and pleasure of the delegates. The arrangements were in charge of B. P. Alschuler, attorney for the A., E. & C., who was highly complimented by the members for his excellent planning.

The Trend in Advertising the Electric Railway*

BY E. E. SOULES
Manager of Publicity Illinois Traction System, Peoria, Ill.

JUST as there have been changes in types of equipment and methods of operation in the electric railway business, so has the advertising of electric railways undergone many experiences that have required readjustments and changed tactics in recent years. First came the early days of the industry when the newly built electric railway, emulating the example of its only competitor, adopted the methods of the old-time steam railway. Those were the days of the flaring poster and handbill heralding cut-rate excursions, "knocking" the service and facilities of the other fellow's line and offering a dollar's worth of transportation for a half-dollar's worth of coin.

The electric railway, however, soon found that its contact with the public was much closer than that of the steam road. Its cars passed the door of the merchant, the newspaper man and the home of the best (as well as the worst) citizens in the cities and villages along its lines. It had a new and interestingly different story to tell. It had a personal contact to maintain with the folks in the towns along its lines and the medium through which the desired *entente cordiale* could best be established and maintained was the newspaper. Coincidentally with this, the advertising departments became known as "publicity" departments.

Then, after a few years of "publicity work," during which the public was being introduced to the electric railway, and the newspaper editors and operating officials had become accustomed to calling each other by their first names, the period of increasing fares put the newspaper men in an embarrassing position with their readers. Our newspaper men began to show signs of fading friendship and lack of understanding of our situation. Those of us who knew the newspaper men, however, could see the reason for their position on the utility question. So, again the wise ones in the operating field sensed a new angle and the period of "public relations" publicity was at hand.

The work of acquainting the public with the truth concerning the utility industry is still an important part of the advertising policy of the electric railway, as every operator is aware. But, there is a new problem that needs attention. And this leads to what I am going to refer to as the fourth, or present-day cycle in electric railway advertising.

MERCHANDISING ADVERTISING NOW NEEDED

The merchandising of electric railway transportation is today the new problem of the electric railway. The advent of the automobile and the hard road has opened a new competition which must be met by vigorous tactics if the electric railway is to survive. It is not necessary to tell electric railway men what the automobile and the hard road mean. Both city and interurban operators have felt the effect in decreased passenger receipts and can see what is going to happen to freight revenues unless new and convincing methods are devised in combating the new competition.

Naturally, this situation seems to be one to trouble the traffic department, but in my judgment it should also be first in the mind of those responsible for the advertising policies of the electric railways. In the final analysis, what is advertising but merchandising? Advertising, strictly speaking, is one of the means by which a product is marketed to the public. If the merchandising policy behind the advertising is weak or lagging, the advertising cannot and will not produce results. So, it appears to the men on the advertising end of the industry that concerted action on the part of the traffic officials with the idea in view of building a strong and convincing merchandising plan with which to meet the new competition is the most urgent need of the electric railway.

We thought we had competition in the past, but in the broad sense of the word the electric railway has had no real, active, virile competition such as that now offered by the automobile and its chief ally, the hard road. The problems of the electric railway to date have been those of operating, engineering and public policy. The problem today is that of selling a service to the public, and selling it so well that the public will select it in preference to that of all competitiors. It is a question of merchandising in the truest sense of the word.

Many individual companies have already anticipated the changed conditions and have laid a foundation for merchandising their product. From them we can gain ideas that will help build up a broad merchandising policy for the electric railways in this territory.

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*Abstract of paper read before Illinois Electric Railway Association at Aurora, Ill., Oct. 14, 1921.

American Society for Municipal Improvements to Meet in Baltimore

THE twenty-seventh annual convention of the American Society for Municipal Improvements will be held at Baltimore, Md., on Oct. 25, 26, 27 and 28, with headquarters at the Southern Hotel.

An extensive program has been planned to include, among other things, on Tuesday, Oct. 25, a paper on Public Service Relations by Major Ezra B. Whitman, of the Maryland Public Service Commission; on Wednesday, Oct. 26, the report of the general committee on city planning and its sub-committee on utilities; on Thursday, Oct. 27, the report of the general committee on street paving, street design, street maintenance and street railway construction and its sub-committee on street railway construction, as well as many other papers and reports on paving, especially one on specifications of street railway pavements, including track construction; and on Friday, Oct. 28, the report of the committee on transportation and traffic, and a paper on subways for city transportation.

The program of the convention is a heavy one and contains much else of interest to municipal engineers as well as many entertainment features.

Railroad Division of A. S. M. E.

THE Railroad Division of the American Society of Mechanical Engineers will discuss the elimination of waste on railroads in connection with the general consideration of that topic at the annual meeting of the society. Three papers will be presented, as follows: "Avoidable Waste in Locomotives as Affected by Design," by James Partington, American Locomotive Company; "Avoidable Waste in Operation of Locomotives and Cars," by William Elmer, Pennsylvania Railroad; "Avoiding Waste in Car Operation—The Container Car," by W. C. Sanders, New York Central. The meeting will be held at 29 West Thirty-ninth Street, New York, on the morning of Dec. 9.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Service Ordered Resumed

Electric Railway Service Will Be Restored in Des Moines on Passage of New Franchise

Early resumption of railway service in Des Moines is in prospect, for Judge Martin J. Wade of the federal court on Oct. 17 ordered the receivers for the Des Moines City Railway to resume service on the day that the City Council finally passes the proposed franchise ordinance.

By suspension of rules the City Council on Oct. 17 passed the franchise for its first and second readings, but under the Iowa law such ordinances must lie over for one week in the form in which they are to be finally passed. If the ordinance now before the Council is not amended it would therefore be possible for the franchise to be passed finally on Oct. 24. This would permit service to be resumed the following day. At the present time it would seem that there is little chance for further amendment of the franchise draft.

Judge Wade's memorandum and order states that the trustees for the bondholders under whose plea service was ordered abandoned would not consent to furnish the money necessary for the resumption until the City Council has finished with the franchise. Judge Wade further stated that the trustees had agreed to furnish the financial resources to permit of resumption of service, but was not specific as to what degree of service it is proposed to give on the resumption of service.

Further encouragement was given by the union employees of the company, who on Oct. 17 announced that they had agreed to accept a cut in wages of 7 cents an hour. The men claim that this cut will reduce operating expenses approximately $125,000 a year and will act to increase the cushion fund provided for under the new franchise and thus tend to an early reduction in the fares.

Upon news of Judge Wade's order the City Council was called in special session and hurriedly passed a resolution barring the buses from streets where there are railway lines. This provision will be effective from the day that service is restored by the railway.

Previous to the developments of Oct. 17 Judge Wade had called a meeting of those interested in the railway controversy, but in his memorandum issued simultaneously with his order he stated that he considered such a meeting at this time inadvisable, in view of the developments.

With the exception of the power clause, there were few changes in the franchise draft as passed by the Council on Oct. 17. It has the approval of Corporation Counsel Miller and two attorneys named by the Greater Des Moines committee to assist Judge Miller in handling the franchise. Agreement upon the power clause was reached after many conferences, which did not end until late Sunday night. The clause has been changed so that the Des Moines City Railway is now empowered to "sell energy to interurban railways for the operation of interurban railways and for the transaction of their business." It will be recalled that the power clause was proposed by the Harris interests controlling the railway and that its presentation resulted in delaying the negotiation.

The principal features of the franchise as passed on Oct. 17 are as follows:

Fare.—A sliding scale fare starting at 8 cents and tapering off as the earnings of the company increase to a low point of 5 cents.

Tenure.—The grant is exclusive for a period of twenty-five years in so far as electric railway operation is considered.

Extensions.—Provides for extensions of lines when it is proved that such extensions will at least pay cost of operation together with reasonable depreciation.

One-Man Car.—Omits the two-man car provision of the former contract and gives the company the right to operate one-man cars under certain conditions.

Arbitration.—The franchise makes the Iowa Board of Railroad Commissioners the arbitration board and in case they refuse to serve provides for the appointment of three non-residents of Des Moines by the justice of the Iowa Supreme Court and two associate justices.

Dividends.—No dividends are to be paid upon the common stock until the cash fare is reduced to 7 cents. At 7 cents a 3 per cent dividend is authorized; at 6 cents a 4½ per cent dividend; at 5 cents a 6 per cent dividend, and at a 5-cent cash fare with ten tickets for 45 cents, 7 per cent is authorized.

Buses.—Buses are abolished from car line streets except in crossing bridges.

Owl Cars.—Owl cars are to be provided at a fare twice that of the day fare.

New Haven Adopts the Motor Car

Self-propelled motor cars are to be used by the New York, New Haven & Hartford Railroad on some of its branch lines. A preliminary announcement to this effect was made from the company's headquarters in New Haven on Oct. 14. It is understood that the initial order calls for supplying three of these vehicles. They will be furnished by the International Motor Company. The first of them will be placed in service on lines between New Haven and Hartford and between Middletown and Willimantic. Others will be placed in service in the Rhode Island and Cape Cod country. The actual routes of the new vehicles have not yet, however, been determined. A statement giving the details with repect to the service which it is proposed to establish with the new motor cars is expected to be made within a few days from the office of President Pearson.

Court's Aid Invoked

Despite This Action Prospects Appear Better for Early Settlement in New Orleans

The State Supreme Court of Louisiana on Oct. 4 took under advisement the opposition of Assistant Attorney General Luther E. Hall to the injunction granted by Judge Provosty of the Supreme Court in the so-called railway case. The injunction lifted the order obtained some months ago by Assistant Attorney General Hall in the Civil District Court against the Commission Council seeking to prevent that body from carrying out its reported intentions of giving the railway a return of 8 per cent on a valuation of $44,000,000 and fixing a rate of fare.

The Assistant Attorney General, it will be remembered, alleged that one Supreme Court Judge alone was without authority to set aside the order of Judge King, of the Civil District Court.

It is possible that the delay in reaching a settlement of the railway troubles of New Orleans on the plan submitted by Commissioner Maloney, of the Department of Public Utilities, which appears to have been ironed out to the satisfaction of both the Commissioners, the Mayor and the representative of the eastern security holders, may be waiting the action of the court of last resort. One thing is quite certain, it is still hanging fire and has not as yet been submitted to the Commission Council.

The reason given for the delay has been the illness of Mayor McShane. The commissioners themselves are unwilling even to venture a prediction when the matter will come up.

Two bills were introduced in the Legislature during the week having a bearing on the New Orleans Railway & Light Company.

One of these seeks to clothe the Commission Council of New Orleans with a rate fixing power over public utilities and defines the power of the Commission Council in fixing the rates.

The other bill grants indeterminate permits for the use of streets to railway, gas and electric light companies in cities of 100,000 inhabitants or more.

Eureka Takes Over Street Railway System

The Eureka Street Railway, the successor to the Humboldt Transit Company, Eureka, Cal., is now operating the railway system in the City of Eureka. Under municipal ownership the management passes into the hands of the Superintendent of Public Works, John Griffiths. There was no change in the personnel except the pay of platform men has been reduced from 50 to 45 cents an hour.

$5,787,196 Is Being Spent for Improvements in Columbus

By the end of the current year, the Columbus Railway, Power & Light Company will have expended $5,787,196 in new construction work and betterments, in connection with the lighting and railways services. This includes a total of $3,584,719 in power plant, substation and transmission line construction, $471,777 in new underground conduit lines, $182,000 in extending street-car lines, and $1,398,700 in new track construction, special trackwork and other work incident to this.

This extensive rehabilitation and new construction program has been instigated under the presidency of Charles L. Kurtz, and while some of the planned work has recently had to be postponed on account of the general business situation, the physical property of the company in both the railway and lighting services will have been greatly improved by the end of the year, placing the property in a much better condition to meet the demands of the community.

Owing to the exceedingly low rate of fare which prevailed in Columbus prior to the war, and in fact until some time thereafter, the physical condition of the railway property became very bad. This gave rise to the demand for the extensive rehabilitation and construction program in the railway.

The financing of this work was extremely difficult owing to indebtedness accumulated under the low rate of fare. It was finally done through an issue of $3,000,000 of three-year 8 per cent bonds, attended by two restrictive features. One of these was that a $50,000 monthly sinking fund must be set aside to liquidate the debt. The other was that the company is obligated to secure the consent of the underwriters before any additional securities can be sold.

These and other matters included in the program were referred to in the ELECTRIC RAILWAY JOURNAL of April 19, shortly after their inception.

Peter Witt Retained in Seattle

The Seattle City Council has employed Peter Witt, Cleveland, to make a survey of the municipal railway with a view to effecting economies in operation. Mr. Witt expects to conclude his survey by Dec. 17, and the City Council has indicated that it will await the completion of his work before taking any important steps toward reducing fares.

The Council is also awaiting the return from the East of D. W. Henderson, superintendent of railways, who attended the meeting of the American Electric Railway Association in Atlantic City, visited the installation of the trackless trolley on Staten Island and studied transportation problems elsewhere en route.

Other developments in the railway situation in Seattle include the enactment of an ordinance appropriating $50,000 for municipal buses to serve Cowen Park, South Beacon Hill and other suburban districts; passage of the $680,000 ordinance for retracking First Avenue and other betterments; adoption of an ordinance under which buses may operate in connection with the street railway, on a 10-cent fare with transfer privileges, and a 50-50 basis with city cars. The vote on Councilman C. B. Fitzgerald's 5-cent fare ordinance has been postponed until after the return of Mr. Henderson.

The $680,000 bond ordinance passed provides for renewing the tracks on First Avenue, purchase of twenty-five new street cars, and payment of the Western Washington Power Company for the Greenwood Avenue car line bought last year by the city.

"Boycott" Started in Hyde Park District

Agitation of Long Standing Renewed in Effort to Secure Lower Fare

A boycott has been started against the Eastern Massachusetts Street Railway by the residents of Hyde Park for the purpose of forcing a reduction in fares to Boston.

Without giving the company any formal notice of their intention to take such action some individuals in Hyde Park, assisted by the Board of Trade of the town, started to operate a free jitney service from Cleary square and the boundary line between Hyde Park and Boston. For about a week they operated touring cars and buses for the free use of the public, and have now established a nominal rate of fare, selling tickets that are good for a week. They are giving this jitney service, at less than cost, not only over the line to Boston but along all the other lines which the Eastern Massachusetts Railway is operating in Hyde Park, in the hope that this course will induce the railway to reduce its fare from 10 cents to 5 cents.

Thus far the Eastern Massachusetts Street Railway has taken no notice of the boycott. It is operating as usual on a fifteen-minute schedule during the ordinary hours of traffic and on a ten-minute schedule during the rush hours on the Boston line. It has not reduced the fare and has no present intentions of making a reduction.

The boycott is aimed at one of the companies maintaining one section of service between Boston and Hyde Park. The Boston Elevated Railway maintains the other section, the two companies meeting on the boundary line and each of them charging 10 cents for the part it operates. The main and ultimate object of the Hyde Park Board of Trade is not to reduce the fare on the particular company against which it has started a boycott, but to establish a 10-cent fare between Boston and Hyde Park, where the combined fare of the two companies today is 20 cents.

Subway and Elevated With Steam Suburban Service Recommended

A rapid transit system consisting of a subway and elevated line and a new steam suburban service which would greatly build up the city of St. Louis and increase the population is suggested in the extract from the annual report of the Department of Public Utilities pertaining to Rapid Transit System. The report is for the year ended April 11, 1921. It is signed by Engineer Charles S. Butts.

In the matter of steam service the report recommends the operation of suburban trains from the east side of the Mississippi River and the establishment of a suburban station at Twelfth and Market Streets.

On the elevated and subway development the elevation of the Hodiamont line is recommended. The distance to be elevated from Maple Avenue to Spring Avenue is about 3½ miles; length of subway from Spring Avenue to the new station at Broadway and Lucas Avenue is 2½ miles. The entire project might be constructed for $3,000,000.

The report further recommends that plans for other subway lines should be developed in districts not available to the present proposed system and some means devised to build them as soon as possible.

The report states that with the above elevated and subway system installed with a station at Broadway and Lucas Avenue, and the installation of a steam railroad suburban system, with a suburban station at Twelfth and Market Streets, it will be a step in the right direction and will give a large part of the city and county a rapid transit system. It says: "We cannot hope to build up our city, especially in the outlying districts, without a more rapid system of transportation than that which is given by the surface lines."

Railway Men Win State Championship

Athletics have proved a popular organization program in the Kansas City Railways this summer and fall. The eight baseball teams which constitute the league of the company's divisions and departments completed their schedules on Sept. 15. The attendance at the games was far larger than in any previous year.

Baseball enthusiasm was further stimulated by the success of the "Tramways," the team representing the company in the Independent Semi-Pro. League of the State. The Tramways justified the fine support given by the organization by winning the championship of the state. The final game in this series was scheduled for Oct. 9, but the pennant had been won before that date.

As the baseball season closes, plans are being made for organizing a basket ball league, to continue the interest in athletics through the winter season.

Connecticut Men Cut

Wages Reduced 8⅓ per Cent by Arbitration Board—Company Arbitrator Dissents

A reduction of 8⅓ per cent in the wages of trainmen employed by the Connecticut Company, operating more than 500 miles of line, has been decided upon by the board of arbitration. The official decision of the board was written late during the week ended Oct. 15 by Judge John K. Beach, New Haven, and has the approval of James H. Vahey, Boston, attorney for the men. Joseph H. Berry, Hartford, the third member of the board and representative of the Connecticut Company, disagreed with the majority opinion. He maintained that a reduction of at least 15 per cent should be authorized.

At the old scale, the men received 54, 57 and 60 cents an hour, the wage increasing to the maximum with three years' service. One-man car operators received 15 cents in excess of this scale.

The arbitration decision establishes a wage of 47 cents for the first three months of service with 51 cents for the next nine months and 55 cents thereafter. The latter figure, reached after one year's service, is the maximum. One-man car operators will receive 10 cents over this scale. On the matter of the guarantee to spare men the contention of the men was allowed with reservations.

The application of the principle of a reduced scale for the first three months is an innovation on the Connecticut Company lines.

Judge Beach, in writing his decision, found that the uncertainty of the reduction in living costs, reported in the last year, would not justify a more drastic reduction than that given. He did not agree with the company's contention that a cut of at least 10 per cent should be made. Mr. Berry cited figures to show there has been a decrease in living costs of 20.8 per cent in the last year.

The company has agreed to abide by the decision of the Arbitration Board. The new wage scale will be retroactive to June and an agreement will later be made to reimburse the company for the excess over the new scale, which has been paid since last June. The agreement for arbitration provides that if the company and employees cannot themselves reach an understanding as to how the retroactive feature of the award is to be put into effect, it shall be decided by Judge John K. Beach.

The text of Joseph F. Berry's dissenting opinion shows the company officially asked for a 17½ per cent reduction as compared with an 8⅓ per cent cut decided on by Judge Beach and Mr. Vahey.

The position of the company on the various points in dispute may be taken to be pretty accurately reflected in the minority opinion of Mr. Berry, who found himself unable to concur in the views of his associates with reference to the wage scale. He concurred in the award of 10 cents an hour additional over regular rates to one-man car operators and in the spread of the graduated scale, although this is against the company's contention. He said in part:

> As to the wage scale, I cannot accept the conclusions of the majority. The logic of their reasoning leads to a greater reduction than from 60 to 55 cents for the maximum hourly rate, about 8⅓ per cent.
>
> The application of the cold, clear laws of logic would call for a reduction of about 20 per cent; that is, from 60 cents to 48 cents. The company has not asked this. It recognizes, as I do, that there should, in fairness, be a margin to cover possible increase in the cost of living, and so that the men may not lose all that they have earned in improved standard of living.
>
> A reduction of 17½ per cent., from 60 cents to 49½ cents (say 50 cents), would still leave a margin of 2½ per cent for this purpose, or 1½ cents an hour. Every cent means approximately $90,000 a year to the company.
>
> The majority, however, awards 55 cents, a reduction of about 8⅓ per cent. A reduction of, say, 15 per cent or to 51 cents an hour, should in my opinion be made at the least, not only in justice to the company, but to the public, whose demand for lower fares cannot be met without greater relief from the high wages of war time.
>
> The payroll now exceeds 54 per cent of the company's gross receipts. Capital, as well as labor, is entitled to a fair living wage.

The questions submitted were not defined in the original submission, but were later formulated as follows:

1. The wage rate to be paid by the company to its motormen, conductors and other employees for the twelve months beginning June 1, 1921, including the length of the graduated scale.
2. The differential in excess of the regular rate to be paid to operators of one-man cars for the same period.
3. The guaranty to be established for the extra or spare motormen and conductors for the same period.

The first and most important question was the rate to be paid the motormen and conductors, called the blue uniform men. It was agreed that if any reduction were made in the maximum rate paid to them, the wage rates of all other employees represented by the committee should be readjusted by applying the same percentage of reduction.

Cost Details Stated

In his report to the Board of Public Works outlining in detail the San Francisco (Cal.) Municipal Railway extensions and improvements, M. M. O'Shaughnessy, city engineer, included the accompanying table of costs. This table gives a comparison of costs of four routes for electric railways into Sunset District, Forty-ninth Avenue and Judah Street Terminus referred to previously in the ELECTRIC RAILWAY JOURNAL.

D. U. R. Case Presented

Company Goes Direct to Public With Statement of Its Attitude on Proposed Ouster

Allen F. Edwards, vice-president of the Detroit (Mich.) United Railway, has made a statement to the public with a view to fully informing the voters of the exact situation before they go to the poles to vote on the ouster ordinance. The company's stand is reiterated relative to selling the Fort Street and Woodward Avenue tracks to the city on sections where franchises have expired. Mr. Edwards stated that in as much as doubt seemed to exist regarding the position of the company in connection with the so-called ouster ordinance to be voted on at the municipal election on Nov. 8, he felt called upon to state the company's position clearly.

OUSTER ORDINANCE AFFECTS WOODWARD AVENUE

He cites that the ouster ordinance affects directly the Woodward line from the Grand Belt line to the river and the Fort and West Jefferson lines from Artillery Avenue to the east, including the extensive turning facilities in Cadillac Square. If the city through the Street Railway Commission desires to obtain possession of these parts of lines through purchase by direct agreement or through the process of a board of arbitration, the company stands willing to co-operate with the city to that end.

He further states that if, on the other hand, the Street Railway Commission insists that the company must accept the outrageously low offer of $388,000 for these parts of lines or quit service and remove its rails and other property from the streets, there is absolutely and unqualifiedly no other course for the company to follow than to abandon service thereon and take up the tracks. Under no circumstances will it be possible for the company to accept the inadequate and unfair offer of $388,000 for more than 23 miles of track together with overhead and underground equipment.

The trackless transportation amendment to the city charter, on the ballot on Oct. 11, failed to receive the necessary 60 per cent vote for its approval. About a 59 per cent vote was cast in favor of the amendment. It was announced immediately following the canvas of the votes that if there were no barriers due to lack of sufficient

	Cost of Track	Cost of Tunnel	Total Cost	Annual Cost of Operation and Interest on Railway Cost	Miles New D. T.	Distance Ferry to Ocean (miles)	Running Time (minutes)	Tunnel Length	Grade in Tunnel (per cent)	Heaviest Grade on Line (per cent)
Grove Street...	$850,000	$450,000	$1,300,000	$350,000	5.65	7.75	47	1,350	2.6	9.5
Duboce Avenue	567,000	1,900,000	2,467,000	307,000	4.54	7.24	39	4,200	2.85	7.0
Eureka Valley.	500,000	1,400,000	1,900,00	311,000	3.91	7.53	40	3,400	4.0	5.4
Laguna Honda.	464,000	300,000	914,000	314,671	3.48	8.48	42	900	4.0	4.2
Change in road	....	150,000	....	....	....	....	..	....	...	....
For comparison: Market Street Railway, No. 7 (Haight Street line)					...	7.24	43	No tunnel		12.1

time, the proposed amendment would be put upon the Nov. 8 ballot. The amendment would empower the Street Railway Commission to establish trackless trolley systems in the city.

City officials have expressed the belief that the questions covered in the amendment were not thoroughly explained to the voters and on this is based the opinion that if again presented to the people the amendment would carry. It is explained that the amendment does not call for any new appropriation of money, but that all such equipment for trackless transportation lines will be purchased with a part of the $15,000,000 bond issue authorized in 1920. Mayor Couzens and the councilmen are in favor of the provision of the amendment, believing that it is important that the city be empowered to utilize the new development in transportation methods.

As another step in the working out of the plans for the election in November Daniel W. Smith has been nominated to oppose James Couzens in the coming mayoralty race, Mr. Smith's eligibility as a candidate having been definitely established. The fact that he has recently resided and voted outside of the city of Detroit was not considered as grounds for declaring him ineligible in the courts.

Service Crippled by Power Plant Accident

By a series of unavoidable accidents the Tri-City Railway & Light Company, Davenport, Iowa, was hard hit on Sept. 21. The 20,000-kw. turbine of the company had broken down a few days before and part of it had been sent to Pittsburgh for repairs, so the plant was short its main reliance. On the night of Sept. 20 there was a severe electrical storm and the second machine, a 15,000-kw. turbine, was put out of service.

This left the station with two old machines which had been kept merely for emergency purposes, a 9,000 and a 3,000 kw. But at 7:10 on the morning of Sept. 21, when these two machines were being tuned up to shoulder the peak load, the spindle on the governor of the 9,000 kw. broke.

In this emergency the old 3,000 machine and the hydro-electric plant at Sears were called on for their last drop of "juice" and until repairs were made on the 9,000-kw. machine the plant was hard hit to supply enough power to run cars and the power and lighting circuits.

The lighting circuit was not interfered with. Power circuits were restored in Davenport, Iowa, at 11 o'clock and in Rock Island and Moline, Ill., at noon. The generator in the steam plant at Davenport was called on, this auxiliary being available because the plant was being tested out preparatory to furnishing its steam service through the winter months. By the use of this auxiliary the power and lighting circuits were kept going and a few street cars were operated.

The crippled service affected the Muscatine, Iowa, street cars and the interurban cars operated between Clinton, Davenport and Muscatine.

New York Would Install More Trackless Trolleys

Municipal "trackless trolleys" operation between Richmond and Tottenville, Staten Island, a distance of about 9 miles, was proposed by Grover A. Whalen, Commissioner of Plant and Structures of the city of New York, in a report submitted on Oct. 18 to the Board of Estimate. Commissioner Whalen asks that $177,700 be appropriated to establish the new line. Commissioner Whalen's recommendations are:

> That this department be authorized to establish a trackless trolley system between Richmond and Tottenville, to be operated by electric current generated at the Sea View Hospital power plant.
>
> That corporate stock in the amount of $177,700 be authorized for such installation.

The estimated cost includes the erection of a double overhead trolley system 9 miles long, construction of 7 trackless trolley cars, erection of transmission line from Sea View power house to Richmond, feeder lines along the route, automatic substation, electric generator to increase power output at Sea View and shelter for cars and spare parts.

Mr. Whalen said:

> It is now my duty to report to you that these trackless trolley systems have been installed and are in successful operation between Meier's Corners and Linoleumville and Meier's Corners and Sea View Hospital.

This installation was described in detail in the ELECTRIC RAILWAY JOURNAL for Oct. 15.

Berkshire Men Accept Cut

Motormen and conductors employed by the Berkshire Street Railway, Pittsfield, Mass., will accept a wage reduction of 8⅓ per cent, retroactive to June 1. The reduction follows an agreement between the union and the company, a few months ago, that the Berkshire employees would abide by the decision of the arbitration board in the case of the Connecticut Company and its employees. This latter board recently announced its findings for a reduction of 8⅓ per cent.

Hearing on Transit Plan Postponed

Nov. 10 has been set as the date for the first hearing before the New York Transit Commission on the outline of its proposed transit plan, reviewed at length in the ELECTRIC RAILWAY JOURNAL for Oct. 1, page 557. It was originally proposed to start the hearing during the week commencing Oct. 17. A statement by the commission follows:

> The outline of the plan published by the commission at the end of September, was given out at the earliest date at which it could be completed, in order to inform the public of the progress made, and to furnish a basis for study in advance of the hearings. The reception given the report by the press and the discussion that has followed have been gratifying. But while much of the criticism has been constructive and of a helpful tendency, there has been a pronounced disposition in some quarters to make the transit plan a football of politics, employing prejudiced misrepresentation and abuse in place of dispassionate inquiry.
>
> It has become increasingly evident that such an attitude makes it futile to attempt to develop the plan through the medium of the examinations proposed while the campaign is on.
>
> The commission's program has nothing to do with politics, and its action will not be affected either one way or the other by the issue of the election. Its function is to work out a reorganization based on sound economic principles, to repair as far as it can the damage that has been done and to relieve the present intolerable conditions as soon as possible with the degree of sureness required.
>
> The commission believes, therefore, that a short delay in beginning its series of hearings—which could in no event be finished until a considerable time after election—will be more than compensated for by the better progress that will be made when the whole matter may be approached free from the biased and unreasoning spirit engendered by a political contest.

Richmond Wages Continue Unchanged

No change in the wages paid employees of the Virginia Railway & Power Company in Richmond, Petersburg, Norfolk and Portsmouth is to be made at this time, and the same working agreement between the men and the company is to continue in force until further notice, though it will not be renewed for another year. Announcement to this effect was made on Oct. 5 at the conclusion of a conference between representatives of the employees and officers of the railway company.

All relations between the men and the company are to continue as they now exist until some further decision is made, dependent upon conditions in the four cities. This solution of the problem was said to have been satisfactory to both interests. The present agreement made for one year expired on Oct. 16.

President Thomas S. Wheelwright, of the company, issued the following statement:

> Officials of the Virginia Railway & Power Company were in conference yesterday and this morning with representatives of employees of the company in the matter of contract covering wages for another twelve months' period, the present contract expiring on Oct. 16.
>
> The company advised the representatives of the employees present that owing to the unsatisfactory conditions prevailing in the street railway field and the uncertainty as to what action looking towards relief might be taken by the councils in the respective cities concerned, it would not see its way clear to renew the contract as to wages for any definite period. It is the company's intention, of course, to live up to any outstanding agreements affecting wages, either verbally or in writing.

Railway Will Be Rebuilt.—In accordance with an agreement reached with A. B. Anderson, Judge of the United States District Court at Indianapolis, and the city of Lafayette, employees of the Terre Haute, Indianapolis & Eastern Traction Company have replaced the connecting track at East Main and Kossuth Streets to permit interurban cars of the traction company to enter the business district of Lafayette. Three months ago the city tore up the connecting track in Lafayette and since then the cars operated on the interurban railway have been stopping at the city limits.

Financial and Corporate

Consolidation Not Obligatory

Legislation Now Being Worked Out Covering Merger of Lines in Washington

Uncertainty as to what the railways in the District of Columbia may expect in the way of legislation was increased by the recent action of the House in voting overwhelmingly to recommit the bill of its District of Columbia committee which was intended to facilitate the consolidation of the Washington Railway & Electric Company and the Capital Traction Company. It is very certain that this rebuff will not deter the committee from reporting out further legislation.

In the discussion of the legislation it was made very clear that nothing in the committee's bill would compel consolidation. It was stated that the object was to remove the obstacle to consolidation and to equalize returns in such a manner as to make it desirable to effect the consolidation. The committee proposed to amend the existing law which provides a tax of 4 per cent on gross receipts and provide a tax of 1 per cent on gross receipts coupled with a tax of 50 per cent on all earnings in excess of 7 per cent on the fair value of the property. In the new bill introduced by Representative Woods, the 50 per cent tax would apply to all earnings in excess of 6 per cent.

It was shown during the debate that the receipts of the two companies are practically the same. Each carries between 75,000,000 and 80,000,000 passengers a year. The difficulties lie in the fact that the Washington Railway & Electric Company carries that number of passengers on 133 miles of track, whereas the Capital Traction Company carries that number on 63 miles of track. The result, it was stated, was that a year ago one company made 11 per cent and the other less than 4 per cent on its valuation. It was pointed out that at present the difference has diminished so that the Capital Traction Company is earning about 10½ per cent and the Washington Railway & Electric Company a fraction more than 5 per cent on their ascertained values.

Merger Under Reorganization Approved

A merger of the Olean, Bradford & Salamanca Railway with the Bradford Electric Railway, Bradford, Pa., has been approved by the New York Public Service Commission. The new company formed by the merger is known as the Olean, Bradford & Salamanca Railway, with headquarters in Olean. Authority has also been granted to issue common and preferred stock to the amount of $3,808,000, with the understanding that rates to be charged by the company shall be subject to the direction of the Public Service Commission. The basis on which the reorganization of the properties following foreclosure is to be carried out was reviewed at length in the ELECTRIC RAILWAY JOURNAL for Oct. 1, page 567.

Ford After Electrics

Automobile Manufacturer Negotiating for Interurbans to Tie In with Steam Line

An option on the line of the Cincinnati, Milford & Blanchester Traction Company, Cincinnati, Ohio, has been taken by Henry Ford, Detroit automobile manufacturer. B. H. Kroger, Cincinnati banker, who is one of the principal owners of the traction company, commonly known as the Kroger Line, said that Henry Ford, while on a visit to Cincinnati, recently opened negotiations for the purchase of this line.

The traction company operates an electric railway between Madisonville and Blanchester, Ohio, a distance of 25 miles. It is said that Mr. Ford wants to connect this line with the Detroit, Toledo & Ironton Railroad, purchased by him some time ago. While the Kroger line is an interurban, its right-of-way could be used for the operation of steam trains and that is what Mr. Ford wants, officials of the traction company said.

Representatives of the Cincinnati, Milford & Blanchester Traction Company have been in Detroit conferring with Ford officials on details of the transfer, but so far nothing of a definite nature has developed. It is known that Ford engineers also have been investigating possible purchase of the Cincinnati, Georgetown & Portsmouth Railroad, which extends east of Cincinnati toward Portsmouth, with the idea of connecting Ironton, the present terminal of the Detroit, Toledo & Ironton Railroad, and Cincinnati, with a direct Ohio River Valley line.

If Mr. Ford obtains title to the great Muscle Shoals nitrate plant in Alabama it is believed to be his plan to push an all-Ford direct rail connecting with Detroit and Muscle Shoals with a southern extension to Mobile, Ala., which would give the automobile manufacturer a direct line from his plants at Detroit to tidewater at the Gulf of Mexico tapping his West Virginia and Kentucky coal properties, Muscle Shoals and the Birmingham, Ala., iron and steel districts.

In the event that Ford purchases the Cincinnati, Milford & Blanchester Traction line he will probably connect it with the Detroit, Toledo & Ironton Railroad at Kingman or Washington Court House, Ohio.

Toledo Reports Surplus

September First Month Under Service-at-Cost That Receipts Exceeded Expenditures

For the first time since the cost-of-service plan was adopted in Toledo last February a report showing an operating surplus rather than a deficit has been turned in to members of the board of control by Street Railway Commissioner Wilfred E. Cann. The report for the month of September has shown that income exceeded expenditures and credits to various funds by $11,110, which compared with a deficit of $20,098 for the previous month.

The report for the eighth month of operation under the Toledo plan came soon after President Frank R. Coates of the Community Traction Company had rescinded his order to increase fares to straight 7 cents.

PEAK IN FARES PROBABLY REACHED

It is believed by the commissioner that the peak in fares has been reached and that in a few months the stabilizing fund will be built up to normal and fares may start down again.

The deficits in all funds except the sinking fund and stabilizing fund have now been wiped out and only book values are found in those two funds. The deficit to the sinking fund will be cleared away this month. This will allow the city to acquire ownership of the lines at a rate of $17,708 a month.

During September the total number of revenue passengers carried was 4,521,868 and the daily average was 150,429, a gain from August, for which month the daily average was 148,658. Total earnings for September amounted to $260,363.

Mr. Cann said:

> During the month operation has been curtailed to the extent of 49,921 car miles, the decrease being attributable to one day less of operation, to the cut in service to Toledo Beach, and to reduction in our mileage due to increased speed.
>
> Rent from tracks and terminals shows a decrease of $4,300, the major portion of which is due to the adjustment made in the rate per car mile charged to interurban lines for use of the city tracks. Revenue from rent of equipment fell off about $500 and is due to the discontinuance of Beach line service.
>
> Revenue per car mile shows an increase over previous month of 3.28 cents, while operating expense has decreased 0.26 cents and maintenance expense has been decreased 0.17 cent. Ratio of operating expense to income has been reduced 1.57 per cent.

Several changes in routes were made by Commissioner Cann on Oct. 16.

During seven months of the operation of the cost-of-service plan the car riders of the city of Toledo have been saved $331,741 by the reduced fare and cost of transfers put into effect at the time the ordinance was adopted. The computations were made by Harold Bailey-Stokes, accountant and auditor for Commissioner Cann. They are based upon passengers carried since Feb. 1. The ownership of the city in the railway property is $123,958. If this were added to the savings the total would be $455,700 gain by the city since the plan has been in operation. These figures do not include the returns for the month of September.

Results of Increased Fare Disappointing

The 7-cent fare which has been in effect on the lines of the Louisville (Ky.) Railway since Feb. 21 has failed to increase earnings in the proportion anticipated, the increase having been only about $200,000 for the period, whereas the company had expected that it would add about $1,000,000 annually to the revenue. A 2-cent increase, it was figured, would increase earnings about 20 per cent.

James P. Barnes, president of the Louisville Railway, reports that a complete survey of the company and its operations will probably be ready by Nov. 15. This survey will deal in part with improved service and reduced cost of operation where possible. Consideration will be given to increased number of one-man cars, two-car trains and of rerouting certain lines.

Decrease in Car Riding in Pittsburgh

There has been a great decrease in car riding on the lines of the Pittsburgh (Pa.) Railways as shown in a comparison of September, 1921, and September, 1920. The present 10-cent fare with three metal tickets for 25 cents went into effect in September, 1920.

In September of this year 24,910,047 passengers were carried against 25,848,563 in the same month a year ago. The receipts in September of this year fell below the receipts for September, 1920, by $126,745.

In July and August of this year there was a greater falling off in the number of rides compared with the same months of last year. Though in those months of this year the fare was 8½ cents and in the same months last year 7½ cents, the receipts were less under the higher fare than under the lower rate of a year ago.

The figures were compiled by the receivers for the city authorities.

Net Earnings Good—Fares Reduced

The Cincinnati (Ohio) Traction Company will reduce fares ½ cent to 7½ cents on all its lines effective Nov. 1. This announcement was made following the receipt of financial reports for August and September of the traction company by William Jerome Kuertz, Director of Street Railways. The traction company's action is based on the report of earnings for these months, showing a net balance of $3,671.90. For the month of August the company had a deficit of $9,722.90, due chiefly to the fact that during that time it had the heaviest ways and construction accounts for any month in several years. This was more than offset, however, by the September report, which showed a balance of $13,394.80.

The big item that tended to produce a surplus in September was the reduction in platform cost, $13,445, or from $211,146.35 in August to $197,699.64 in September. Revenue passengers for August numbered 8,659,835 and for September 8,489,125.

Springfield Line Going Behind

Manager of Ohio Property States Company's Losses in Commenting on Wage Reduction

P. E. O'Brien, general manager of the Springfield (Ohio) Railway, has filed with the City Commission a statement dealing with the recent readjustment of the wages of its men and reviewing briefly the financial condition of the company. It will be recalled that the men accepted voluntarily a reduction in wages effective Oct. 1 of 11 cents an hour, or from 53, 55 and 57 cents to 42, 44 and 46 cents. Mr. O'Brien said in part:

> During 1921 up to Sept. 1, we carried 1,250,000 fewer passengers than in 1920. The new wage scale is as yet 100 per cent increase over Jan. 1, 1916. We have been so pressed for cash that we have been unable to pay our June taxes, notwithstanding the accruing penalties.
>
> The unpaid debts for street paving and reconstruction total $90,000 and are fully shown by the city records. Our monthly deficit has grown from a small amount to more than $11,000 per month for September of this year.
>
> Our pay roll reductions and any other economies cover only a part of the monthly deficit. We can only hold on and hope for business improvement, in which event we hope to readjust all our relations with the city.
>
> Of course no earnings have been available for stockholders for years. Even the preferred stock, which was sold to erect the new carhouse and purchase cars in 1913, has been in default for dividend for seven years.
>
> Our borrowing capacity is exhausted, owing to the fact that our mortgage bonds have been offered as low as 55 cents on the dollar with no buyers.

Attached was a detailed statement showing the wages received by the motormen and conductors from 1916 up to the present time. On Jan. 1, 1916, they received from 20 to 25 cents an hour. On Oct. 1, 1919, the men were increased from 38, 40 and 42 cents an hour to 43, 45 and 47 cents.

The financial statement showed that for eight months in 1920 there were carried 7,868,900 revenue passengers and in 1921 the number carried during the same period was 6,569,984, or a loss of 1,298,916 passengers. The receipts for eight months from passengers in 1920 were $449,542. In 1921 during the similar period the revenue was $425,475. After deducting expenses in 1920 the company's net gain was $11,350, while in 1921 the statement shows that the company sustained a loss of $67,999. Mention is made that no provision was made in either year for dividends on preferred stock.

The report shows that the total reduction per year as a result of the wage readjustment will amount to approximately $55,227, and of that $45,874 is the reduction in the wages of the trainmen. The operating expenses in 1920 for eight months amounted to $338,157, while the cost of operating during the same period in 1921 was $367,850.

Interurban to Abandon 60 Miles

The abandonment of 60 miles of interurban lines constituting the Lima-Defiance, Medway-New Carlisle, and the Columbus-Orient branches of the Indiana, Columbus & Eastern Traction Company was approved by Federal Judge John M. Killits in court at Toledo on Oct. 18.

Application for the action was made by the receivers on the grounds that the lines do not pay. J. H. McClure, receiver, appeared in person before the court and declared that the unprofitable operation was hindering the business of the main line. Before the abandonment can be actually put into effect the company must also have the sanction of the Ohio Public Utilities Commission. It is expected that several towns and cities will make a vigorous fight before the commission when the interurbans seek to do away with the service.

Grafton Properties Sold

Dr. T. F. Lanham, the trustee of the bankrupt Grafton Light & Power Company, offered the entire property for sale recently at Grafton, W. Va., in its various classifications as set forth in the legal publication of the sale. When he offered the entire traction line, including all real estate and certain personal property that had not been offered separately, he received a bid of $14,000, then $15,000 and after a little Mr. Faris, trustee of the Citizens' Bank, Charleston, bid $16,000. The property was knocked down to him.

Dr. Lanham then offered the entire power plant on the south side, or all property comprised in schedule H of the advertisement. The bidding started at $20,000, and it quickly ran up by bids of $5,000 and $10,000 to $60,000. The auctioneer cried the property for some time and no further bids being offered he knocked the property down to N. M. Argabrite, New York, for $62,000.

The local property will be operated in conjunction with the plant which New Yorkers are now planning to erect on the Cheat River at Caddell just below Kingwood. Mr. Argabrite was accompanied by P. H. Powers, his electrical engineer and assistant, and their counsel P. C. Madera, Philadelphia, and Col. Carlton C. Pierce, Kingwood.

Arrangements were made with the trustee to continue operation of the electric railway until the property is turned over to Mr. Faris by the court. He indicated that he intends to continue the operation of the line indefinitely.

City Buys Railway.—The city of Goldsboro, N. C., recently bought all the outstanding stock in the Goldsboro Street Railway, and this railway will be operated in the future under municipal management. The line was discontinued in October, 1920. New equipment has been ordered.

Traffic and Transportation

Jersey Charging 8 Cents

Public Service Railway Has Put New Rate Into Effect Under Court's Restraining Order

Another step has been taken toward securing the advance in fares sought by the Public Service Railway, Newark, N. J. The decree has been signed by the court putting into effect the temporary injunction against the Public Service Commission. The order of the court restrains that body from interfering with the company collecting an 8-cent cash fare or four tickets for 30 cents with 1 cent for transfers, pending final decision by Federal Judges Wooley, Davis and Rellstab of the adequacy of the rate of 7 cents with 2 cents for transfers allowed by the commission under its recent ruling. The company is seeking a 10-cent fare.

NEW FARES CHARGED ON OCT. 20

The railway put the advance into effect on Oct. 20, or just as soon as the company could arrange to comply with the provisions laid down by the court. Under these provisions the company is required to give a bond of $250,000 to guarantee riders a refund in the event the new rate of 8 cents is reversed. Rebate slips must be issued while the new fare is collected. In the event that the final decision of the court is not rendered in two months the company must supply additional bond.

The hearing at which the details were fixed by the court for putting its order into effect was held at Trenton on Oct. 18. Robert H. McCarter of counsel for the company opposed either impounding the extra pennies the company will collect or the filing of a bond. He said either practice would be "irksome and hard for us." He said the money, if used to renew the property of the company, would be protecting the public to better advantage than if it were impounded and saved.

President Thomas N. McCarter of the company suggested that the tokens to be sold be restricted to use by non-transfer riders and that persons paying the straight fare of 8 cents and 1 cent for a transfer be refused refund slips so that they would pay the same as they have recently been paying.

MASTER TO BE APPOINTED

Judge Rellstab wants to have submitted to him by Oct. 27 the names of several men who might qualify as masters to hear the testimony in the final determination of the case. He will then assign the man to sit for the court.

In the meantime the state is rushing its preparations for an appeal at Washington.

The session at which the decree was framed and signed was not held with the formality of a court sitting. It was merely a conference. One of the outstanding features was that while Judge Davis was present, he took no part in the discussion between counsel and members of the court. He had filed a dissenting opinion and Judge Wooley several times explained to the audience that he left Judge Davis out of the conversation because Judge Rellstab and himself were responsible for the granting of the injunction and felt that they should bear the full responsibility for the carrying out of the decree.

Formal Bus Proposals in Saginaw

Six proposals for motor bus service were made to the City Council of Saginaw, Mich., on Oct. 19 by companies offering to organize transportation companies or sell buses to the city to replace the service formerly rendered by its bankrupt street railway system, known as the Saginaw-Bay City Railway. The proposals covering the formation of a company to serve the city suggested a corporation with a capitalization averaging $350,000 and operating a number of buses varying from thirty to sixty cars in the various plans.

All of the proposals for organizing companies asked aid from the city or local business interests, the plan of the Wolverine Transit Company, Detroit, asking that local people subscribe for $125,000 of advance transportation. The proposals were taken under advisement by the Council, which was to meet again Oct. 20 to give them further consideration.

Miss Safety First Trips to Buffalo

Plans for an extensive safety first campaign in the public schools of the city have been outlined by the International Railway, Buffalo, N. Y. A woman who formerly worked in Philadelphia for the Mitten interests has been employed by the International and will be known as Miss Safety First. The co-operation of the municipal authorities and the city school department is sought so that she can deliver lectures and safety first talks in the schools.

Explaining the plans of the traction company, Herbert G. Tulley, president of the International, said the word "don't" will be taboo in the safety first campaign and that instead of telling the pupils in the schools not to do this and not to do that, Miss Safety First will tell them to cross at corners, to look both ways before crossing, etc.

Signs have been placed in the street cars advising children of the appearance of Miss Safety First and urging them to use caution to avoid accidents in the streets.

City's Case Closed

Chicago Rests Its Argument for a Decrease of Surface Line Fares to Five Cents

The city of Chicago on Oct. 14 closed its case against the Chicago Surface Lines before the Illinois Commerce Commission. This is the proceeding in which the commission is being urged to reduce the rate of fare from 8 cents to 5 cents. A continuance was taken until Oct. 25 so that the lawyers might go to Washington and argue another branch of the fare case before the companies start putting in their evidence.

John T. Fanning, an engineer, was one of the city's principal witnesses. He claimed that the operating expenses could be reduced to $31,199,500 by conducting business at a cost of $2.40 an hour as follows:

Item	Per Car Hour	Total Cost
Platform expense	$1.60	$20,800,000
Supervisors, checkers, etc. (500 men)	.085	1,105,000
Repairs (400 men)	.039	507,000
Clerks (150)	.0275	357,500
Power	.25	3,250,000
Maintenance and renewals	.28	3,640,000
Administration and office	.0385	500,000
Compensation and damages	.08	1,040,000
Total	$2.40	$31,199,500

The city did not care to take the burden of saying that wages should be reduced and this witness was embarrassed at times to explain how he could operate without any allowance for reporting time, overtime or any thing other than actual running time.

Another city witness was Special Engineer George W. Jackson, who also was subjected to a long cross-examination. Among other things Engineer Jackson stated that he could save $18,000,000 a year and that he could take care of 2,000,000 additional cash passengers without extra equipment. His system contemplates the abandonment of 8 miles of present special work in the downtown district and the use of single track curves. By simplification of the looping system he said the downtown speed could be increased from 4 m.p.h. to 8 m.p.h. and the speed for the system from 10 to 13 m.p.h. He would also make other changes.

The city is contending that a considerable profit can be made under operation at a 5-cent fare and insisted that even if this were not true the companies should be content with a loss during the remaining five years of the ordinance because of profits in the past.

Courtesy Not "A Lost Art"

The "Civility" Campaign launched the first part of October by the Northern Ohio Traction & Light Company, Akron, Ohio, is proving a big success and has become the watchword of the employees. In a letter addressed to the employees of the railway and invited to be read by patrons of the line, D. A. Scanlon, general superintendent, says: "There is no real justification for insolence from a platform man to a patron, nor from a patron to a man in charge of a car."

Zones Suggested for Los Angeles

Commission Engineer Recommends Two Six-Cent Units for Pacific Electric Railway—Company Carefully Managed

The Pacific Electric Railway's application to the California State Railroad Commission was reheard in Los Angeles on Oct. 11. The appeal is for an increase in rates, which is considered a substantiation of the emergency raise granted the company during July, 1920, by the commission to tide the company through the abnormal cost of materials and labor. From testimony given by Chief Engineer Richard Sachse of the commission, it would seem that radical changes in railway service of various cities in southern California as served by the Pacific Electric lines will be necessary to put the system back on a profitable footing.

MR. SACHSE filed a service survey report of three volumes or a total of approximately 600 pages, prepared by the Railroad Commission's engineers after a study of the situation extending over a period of fourteen months.

Since Mr. Sachse's valuation report of the company's property has been previously made known, the railway company's attorneys at the opening of the hearing expressed a desire to file several exceptions to the valuation figures. The first contention of the railway was against the commission's item of engineering; namely, 5 per cent. The company contended that 6 per cent was the reasonable figure for this particular item. The railway also took exceptions to the multiple ratio used by the commission in arriving at the value of the company's right-of-way, claiming too low a value was allowed.

The item of interest was contested. Whereas the commission in one of its estimates figured it at 6 per cent, the company contended it should be allowed at least 8 per cent in order to take care of its amortization of the bonds. Exception was also taken to the commission's method of treatment of allowing interest on funds during construction period and to the commission's report of the valuation of the company's park and resort property. The commission set aside this property at its valuation cost of some $449,000 as non-operative property. The company contends that this should be included in the operative property.

NON-PAYING LINES SHOULD SHUT DOWN

Chief Engineer Sachse of the commission was on the stand the entire day reviewing in general his service survey report, but the attorneys for the various municipalities pleaded for a further continuance of the case until they could study his report and be prepared to present their objections. Nov. 14 was set as the date to continue the case, while Oct. 11 and 13 were devoted to hearing Mr. Sachse testify in general as to the contents of the report and his recommendations to remedy the Pacific Electric's financial condition.

Mr. Sachse recommended that many non-paying lines be discontinued. In his report he states that the entire system now shows a gross deficit of $13,443,444, and is in default on bond interest to the extent of $5,000,000. The company has been operating at a loss of $500,000 to $1,000,000 annually; and under these conditions, the engineers find, the company faces being delivered in the hands of receivers.

The commission's engineer ascribes the present condition of the railroad's finances largely to the "cut-throat bus competition." The motor bus competition involves the big issue of the present hearing and from the report of the commission's engineers it is indicated that a new case at which this particular situation will be threshed out is looming up at this time. Present conditions are believed to show that southern California is going to be the battle ground for the settlement of the motor bus and electric line competition which has rapidly been growing into one of the biggest transportation problems of the country. Engineer Sachse in his report estimated that the bus lines were cutting into the revenue of the company to the extent of $1,000,000 annually. Referring to the federal census of 1920, the commission's engineers point out that while the population in the four counties served by the Pacific Electric Lines increased 78 per cent over that of 1910, passenger travel showed an increase of only 16.5 per cent over the totals of 1914.

The engineers stated that the rates had only increased 38 per cent during the past four years while operating expenses of the railway have increased more than 100 per cent.

Mr. Sachse in his testimony relative to the bus situation stated that it is up to the people to decide which form of transportation they desire, and that he will present to the commission the cost of operation of the interurban lines and the cost of operation of the bus lines. He claims that the bus lines' figures of their cost of operation are not presented to the commission in the proper shape, but that after a thorough study of their operations he has found that it is costing the bus lines a great deal more to operate than they report to the commission.

Mr. Sachse states that the Pacific Electric Lines has invested more than $2,000,000 in street pavement and annually spends more than $400,000 maintaining this street pavement. He recommends that the railway be relieved of the financial burden of street pavement assessments.

With reference to deferred maintenance, Mr. Sachse in his report recommends that within the next three years the Pacific Electric spend $3,000,000 for deferred maintenance, of which amount $1,500,000 represents deferred maintenance of ways and structures, while $1,500,000 represents deferred maintenance of equipment.

In the year 1910 the company carried 50,000,000 passengers, and as the population doubled Engineer Sachse claimed the passenger haul should have quadrupled in the year 1920 or the company should have carried 200,000,000 passengers, but the company carried only 96,000,000, although from 1910 to 1920 inclusive, the system increased its service 3,000,000 car miles.

TWO SIX-CENT ZONES SUGGESTED

The commission's engineers in their report recommended the creation of a two-fare zone in the city of Los Angeles, with a 6-cent fare for each zone and a fare from 10 to 12 cents in riding from one zone into another. Several plans for collection of fares under the zoning system were included in the report. In each case the inner zone boundary would have a radius of 4½ miles from a given center of the city. The outer zone would average 3 miles across the city limits. Under the first plan the business section of Los Angeles would constitute one zone and the outlying residence section the second. Tokens would be sold at the rate of 10 for 50 cents, each token being good for a ride within a zone.

As an alternative for the zone system Mr. Sachse suggested that a flat increase in local fares on the Pacific Electric city lines to 8 cents might be made, but it was pointed out that this plan would be unfair to patrons riding only a few blocks. A proposal was also made to charge 1 cent for each transfer issued.

Among the increases asked for by the company are: Increase mileage rate for thirty-ride family commutation tickets from 1.8 to 2 cents per mile, or 11 1/9 per cent increase; 20 per cent increase in daily commutation sixty-ride ticket; in cities outside of Los Angeles, 10-cent local fare.

At this time the freight earnings represent 30 per cent of the gross income. Mr. Sachse recommended that this freight business must continue.

PROPERTY CAREFULLY MANAGED

Mr. Sachse stated that the company's organization was being handled most efficiently and economically.

Since Mr. Sachse testified that in his opinion no increase in fares on the Pacific Electric lines would be necessary if the electric lines enjoyed the patronage given competitive motor freight and passenger carrying lines, the bus interests are battling against any action that might involve their franchises and operating certificates.

Taxes on Transportation Repealed.—The U. S. Senate agreed recently to the repeal of taxes on freight, passenger, Pullman and express transportation, effective Jan. 1. The repeal was made without a record vote.

Buses to Extend Railway

According to a recent announcement of Meade Frierson, general manager of the Nashville (Tenn.) Interurban Railway, an extension of the line via truck and bus will be made to Columbia. The Nashville Interurban connects Brentwood, Nashville and Franklin.

It is planned to maintain a two-hour schedule between Nashville and Columbia. Passengers will be taken from Columbia to the interurban station at Franklin where they will be transferred to the electric road.

This extension will give to Columbia and Maury County the choice of two carriers for the transfer of freight and passenger traffic, the Louisville & Nashville Railroad (steam) being the other property which maintains a service between Nashville and Columbia.

Adopts Heart-to-Heart Discussion

Richard Meriwether, vice-president and general manager of the Dallas (Tex.) Railway, has adopted a plan of meeting with the trainmen in their various gatherings and discussing with them in a heart-to-heart manner the problems that affect them as well as the company's interests.

In a recent issue of "Partners," the official publication of the railway, some remarks of Mr. Meriwether on his meeting with the employees at the East Dallas carhouse are quoted. In part his talk follows:

> I am fighting for you on the one side and the stockholders of the company on the other. I am the trustee, so to speak. I protect you first and then I scan the books in an endeavor to pay a little interest to the people who have invested their life savings in our company.

Mr. Meriwether said his door was open at all times to men who might seek information about the affairs of the company. He also invited suggestions from the men whenever they saw fit to make them.

To Teach Safety in New Way

Teaching safety, through childhood fairy tales, is a new plan which has recently been started by the Los Angeles (Cal.) Railway, in co-operation with the Board of Education. More than 300,000 copies of folklore classics are being distributed to school children, from the first to fifth grades, inclusive. The back page of the booklets is devoted to pictures and verse, showing how automobile and street car accidents happen, and how they can be avoided.

It is the hope of Mrs. Susan M. Dorsey, superintendent of schools, and agencies working with the Board of Education in accident prevention, that the children will take the little books home to their parents, and incidentally interest them in the move for greater safety. Each book contains eight pages, with colored illustrations. Sixteen different books are included in the series, and each child will receive eight, according to his grade in school. The distribution will cover a period of two months.

The safety suggestions on the backs of the books are not confined to street cars, but include automobiles and general traffic conditions. They do not carry the name of the street railway.

Rerouting Proposed

Best Features of Many Proposed Plans Adopted for Application in Milwaukee

The Milwuakee Electric Railway & Light Company has been directed by the Wisconsin Railroad Commission to reroute certain of its railway lines in the downtown district to effect a reduction in the traffic congestion on Grand Avenue, the city's principal business and amusement center.

The principal change to be made will be the shifting of the Wells-Downer line from Grand Avenue to Wells Street, a parallel east and west thoroughfare. Stretches of track on Wells Street are owned and operated by two other electric railways, the Milwaukee Northern Railway and the Chicago, North Shore & Milwaukee Electric Railway. The shift in the route of the Wells-Downer line will therefore necessitate the joint use of track by the Milwaukee Electric Railway & Light Company, and the two other roads involved. The commission's order requires that the change in the route of the Wells-Downer line be effected within sixty days from date of issuance of the order, that is by Nov. 1, 1921.

Other changes in routing to be made are to be effected within ninety days and will involve the State, National, Third, Vliet and Walnut lines. The purpose of these changes is to eliminate certain objectionable turning movements and reduce the number of street cars passing certain points in the downtown district which appeared at present to be equally as congested as Grand Avenue under present routing. In this connection the commission pointed out that the operation of street cars on the streets should be considered as only one element in the congestion complained of. Many things conspire to create this congestion, it said, and any rerouting of cars can be expected to relieve the condition only partially.

Original action in the case was taken in 1913 when the commission on Dec. 1, 1913, ordered the joint use of tracks on Wells Street owned by the Milwaukee Northern Railway and the Chicago & Milwaukee Electric Railway, now known as the Chicago, North Shore & Milwaukee Electric Railway, by the Milwaukee Electric Railway & Light Company and fixed the terms and conditions of such use. The owners of the track appealed to the Circuit Court of Dane County, which held that the commission's orders were unreasonable in that they permitted the companies having joint use of tracks to examine each other's books and records. In orders issued Jan. 26, 1921, the commission corrected its original orders to meet the court's objections and retained jurisdiction to make further investigation of the question of the proper method of compensation upon application by any interested party. Following this the city of Milwaukee petitioned the commission for an order requiring the Milwaukee Electric Railway & Light Company to reroute certain of its cars from Grand Avenue to other streets. Similar petitions were received from the Milwaukee Safety Commission, Milwaukee Real Estate Board and various civic organizations.

A hearing was held in Milwaukee at which a number of rerouting plans were presented by various civic organizations. The Milwaukee Electric Railway & Light Company submitted its views with reference to the rerouting problem. The company's report suggested the adoption of what in its opinion seemed to be the best features of all the proposed plans as a so-called "composite" plan. Following an investigation by the commission's engineering staff and another public hearing the so-called "composite" plan was adopted by the commission. It forms, in substance, the basis of the commission's present order in the case.

It is of interest to note that the commission points out in its order that the attitude of each of the railways involved has been throughout the entire proceeding, as expressed by their representatives, that they stood ready to comply with any order for the rerouting of cars which the commission determined to be under all the circumstances appropriate and in the interests of the city of Milwaukee and the street car riding public.

Auto Petitions Heard in Connecticut

The Connecticut Company, New Haven, Conn., has recently installed an auto bus service between the tunnel in Hartford and the Union Station as an experiment. If operation of the line is successful, it is said, other routes for a similar service will be established. The Common Council of Bridgeport has petitioned the Public Utilities Commission for additional jitney routes, and has asked the commission to touch on electric railway fares. It is understood, however, that the commission cannot give a hearing to the Bridgeport officials under the terms of the petition. The commission has already conducted hearings on the jitney question in that city.

Auxiliary Motor Bus Service Suggested for Montreal

The establishment of an auxiliary autobus service from St. Catherine Street to Wellington Street, Montreal, Que., advocated by Ald Elie, has been favorably commented on by E. A. Robert, president of the Montreal Tramways, and Messrs. Graves and Seurot, engineers of the company and the Tramways Commission respectively. The matter is now in the hands of the Tramways Commission for decision. The length of the proposed route is about a mile and a half.

Reduced Fares in Sight

Seattle's City Council Will Make Thorough Study of All Transportation Problems

Following the city of Seattle's victory in the "Jitney Must Go" campaign, with the result that jitneys are now barred from all Seattle streets, the City Council is turning its attention to the problem of reducing street-car fares on the lines of the Municipal street railways. The present rates provide a 10-cent cash fare, with tokens valued at 8⅓ cents, for sale on street cars. A number of suggestions have been made for decreasing the present fare, and at an early session of the council as a whole, all ramifications of the city's transportation problems are to be thoroughly discussed.

Councilman C. B. Fitzgerald, chairman of the finance committee, has had introduced in the city council an ordinance that provides for a 5-cent fare, with what is virtually a 3⅓ cent charge for transfers. Under the proposal, a car-rider would pay a nickel for one ride on any street car of the municipal street railway. If he wanted a transfer, however, he would drop in the box one of the 8⅓-cent tokens, which would continue to be sold on cars at three for a quarter.

Another ordinance to be considered is that of Councilman Oliver T. Erickson, who proposes that the city shall pay, out of general taxation, for maintenance and upkeep of the municipal lines, above such sum as would be netted after the Stone & Webster bond interest is paid. Councilman Erickson believes that with such a plan a carfare possibly as low as 3 cents could be maintained. Councilman Erickson's proposition is meeting with little support in the Council. It has been estimated that such a plan would double the present rate of taxes in Seattle.

Important reductions in the expense of operating the Municipal Street Railway lines are expected to be made, the largest of which will be the item of approximately $300,000 in revenues which has been taken from the municipal lines by the operation of jitneys. Councilman Fitzgerald also proposes to eliminate an expense of $140,000 a year now paid to extra operatives hired while employees of the street railway are on their 15-day annual vacations on full pay. Mr. Fitzgerald expresses the opinion that with a proper and economical operation of the lines, the reduction in fare will not result in a call on the general taxation funds to meet expenses. Every member of the City Council favors a reduction in fares, if such a change can be made and the operating expenses of the lines covered without resorting to general taxation.

An ordinance that is now before the City Council proposes an appropriation of $50,000 for the purchase of municipal buses to be operated on the Cowen Park route, these cars to run direct to the city from Cowen Park without stopping en route to pick up or discharge passengers. Residents of the district are extremely anxious to secure this service and have appeared frequently before the Council to urge their claims.

Mayor Hugh M. Caldwell, skeptical as to the advisability of reducing fares on the municipal railway to 5 cents, recently called together a group of lawyers to discuss the possible effect of a 5-cent fare. The consensus of opinion was that failure to charge an adequate fare might make the city liable to a damage suit from bondholders. Assistant Corporation Counsel J. T. Kennedy expressed the opinion, however, that there is no legal question involved until it is determined by experts and statisticians that the 5-cent fare would be inadequate to pay the interest and principal, and the cost of operating the railway. The so-called "adequate fare" clause of the railway utility bonds was defined by attorneys as requiring the city to charge a fare adequate to meet interest and redemption without any reference to cost of operation.

Under the present 8⅓-cent fare, the municipal railway will go on a warrant basis on or about Jan. 1, 1922, in order to accumulate sufficient funds to meet the first payment of $833,000 to the Stone & Webster interests next March. This would mean that local banks will be asked to cash pay-warrants, and be reimbursed by the city at a time when the revenues of the railway will permit. In addition to the $833,000 payment, on principal, there falls due next March 1 a semi-annual interest payment of $410,000.

Monthly Commutation Scheme in Muscatine

With the slogan "The more you ride, the less you pay" the Clinton, Davenport & Muscatine Railway will put into effect a new monthly commutation plan in Muscatine on Nov. 1.

Under the new system the frequent rider will ride cheaper than at present. The holders of a commutation ticket will be allowed to ride on any railway line in the city for 5 cents. Tickets will cost 50 cents and will be good for a period of one month. Workmen's tickets in books of fifty will continue to be sold after Nov. 1, but the price will be raised to $2.50 a book.

The accompanying table shows the net cost per trip for from ten to one hundred rides where commutation tickets are purchased.

Rides Month	Ticket Cost	Fare Paid	Total	Net Fare
10	0.50	0.50	1.00	10c.
11	0.50	0.55	1.05	9.54
12	0.50	0.60	1.10	9.16
13	0.50	0.65	1.15	8.84
14	0.50	0.70	1.20	8.57
15	0.50	0.75	1.25	8.33
20	0.50	1.00	1.50	7.50
25	0 50	1.25	1.75	7.00
30	0.50	1.50	2.00	6.67
40	0.50	2.00	2.50	6.25
50	0.50	2.50	3.00	6.00
60	0.50	3.00	3.50	5.83
70	0.50	3.50	4.00	5.71
80	0.50	4.00	4.50	5.62
90	0.50	4050	5.00	5.55
100	0.50	5.00	5.50	5.50

Individuals who will not benefit under the new commutation ticket plan are the occasional traction line patrons. If a man uses a street car ten times per month or less, it will not pay him to invest in the monthly tickets. He will have to pay the full 10-cent fare.

Illinois Commission Denies Certificate to Competing Bus Company

A certificate of convenience and necessity has been denied to the Argo Motor Bus Company by the Illinois Commerce Commission. The company sought to operate a motor bus line in competition with the Chicago & Joliet Electric Railway. This is one of the first orders issued by the new commission in considering a large number of such petitions now pending before it.

The Argo Motor Bus Company started operation on March 18, 1921, without a permit. The Chicago & Joliet Electric Railway filed a complaint with the commission, which ordered the bus company to discontinue operation. The latter failed to obey the order, and the matter was referred to the Attorney General, who applied for an injunction in the Circuit Court. In the meantime the parties who operated the buses incorporated and filed application with the commission for a certificate. The court thereafter refused the injunction on the grounds that an application had been duly made to the commission for a permit and the date for the hearing had been set.

As the result of the hearing before the commission, an order was issued denying the permit on the grounds that the service rendered by the bus company was unreliable and uncertain and that no regular scheduled service was maintained, that no necessity existed for the operation of motor vehicles between the point specified by the application, that the applicant had not complied with the requirements of the law, and that the electric railway was supplying sufficient and adequate transportation facilities.

The commission also stated that to grant the application would result in depriving the public of adequate and sufficient transportation facilities, since it would become necessary for the electric railway to discontinue some of its present service in order to pay operating expenses. The public would be required to pay a higher rate of fare if both motor vehicle and electric interurban transportation were maintained.

The bus company has been operating from the Chicago terminal of the Chicago & Joliet Electric Railway at Cicero Avenue, paralleling the interurban line to a point known as Argo, a few miles outside of Chicago. Now that the commission has issued an order denying the permit, the court will undoubtedly grant an order restraining the bus company from operating if the latter continues.

Fare Reductions Sought

Connecticut Cities Seek to Return to the Five-Cent Unit—Company Behind 1916 Record

At a hearing before the Public Utilities Commission of Connecticut on Oct. 18 officials of the city of Norwalk asked for a 5-cent fare on the lines of the Connecticut Company only between certain points. Evidence, however, disclosed an attitude in favor of a general reduction in fares.

L. S. Storrs, president of the company, said the recent reduction of 8⅓ per cent in the wages of trainmen would probably not amount to more than one-third of a cent per passenger on an estimated number of passengers for 1921 including the next two months. The company set up as a standard for comparison the figures of 1916, the company's best year. Even with jitney competition removed, the advance in the number of passengers carried in Norwalk in 1921 over 1916 was only 25 per cent. President Storrs said that a general statement would be made for the company in a few days when the results of the decrease in the wages of the men had been figured out.

Norwalk officials introduced evidence to show that traffic had increased 88 per cent over 1920 since jitneys were eliminated, but the company insisted on 1916 figures as a basis for comparison for reducing fares.

At the hearing on Oct. 18 on petition of the city of New Britain for reduced fares testimony was given indicating a decrease of more than 1,000,000 passengers on that division, between November, 1920, and September, 1921, under a 10-cent fare as compared with the number carried in the same period in 1915-1916 under a 5-cent fare.

The report, however, shows that since July 15, when jitney competition was restricted under the new State jitney law, the average increase in revenue passengers on the New Britain division has been 10.3 per cent. The weekly increase in revenue passengers between July 15 and Aug. 25, according to the figures presented, has ranged from approximately 5,000 to 10,000 passengers.

Under the 5-cent rate during the 1915-1916 period 5,446,467 passengers were carried as against 4,140,757 passengers in the 1920-1921 period under the 10-cent rate. Under the 5-cent rate the fares collected totaled $273,323, while under the 10-cent rate the total passenger revenue was $414,075.

Mayor Barton of Norwalk and Corporation Counsel William K. Tammany favored fare reductions for the city. The Mayor declared that the jitneys carried more than twice the number carried by the trolleys. He said: "It looks to me like good business for the trolley company to reduce the fare to 5 cents and double the number of passengers."

It was his idea that solid popular support for the company would accompany such a reduction.

Mayor Barton said popular feeling would prefer the trolleys to the jitneys if the company reduced fares as this would prove it wanted to serve the public and meet its demands satisfactorily. He urged a trial period at a reduced rate, at least. If the company finds a return to the 5-cent fare to be unprofitable, the people of Norwalk are willing to have the question reopened.

It is generally understood that other cities in the State, where the Connecticut Company operates, have prepared petitions asking for fare reductions. These have been held in abeyance, however, pending a decision on the matter dealing with the two cities mentioned by the Public Utilities Commission.

Jitney Problem Acute in Tacoma

City officials and business men of Tacoma, Wash., fearing the invasion of the jitneys, and looking upon Seattle's long fight as an example, are taking steps to curb the jitney before they become too strongly entrenched. An ordinance providing for strict regulation of jitney operation in the city has been introduced in Council, discussed at length, and put over for further investigation. The ordinance is similar in form to previous measures, except that in the old one, the Council was constrained to give a license upon application, whereas in the new ordinance, the Council may prescribe conditions and refuse a permit if it deems advisable.

Commissioner Silver urged that befor an ordinance be passed "swatting the jitney," the Tacoma Railway & Power Company should be required to state what it will give in the way of improved service or extensions in return for elminiation of the jitney competition from its earnings. Mayor Riddell favored the immediate passage of the ordinance, which is patterned after the Seattle ordinance, and which, if enforced, will mean the possible elimination of jitneys from Tacoma streets. Commissioner Silver pointed out that conditions are different in Tacoma from those in Seattle, where the street car system is municipally owned.

An interesting feature of the move against the jitneys was the request from the local association of street car men that the ordinance be amended to compel jitneys operating in the city to operate on streets at least one block away from car lines, except in the downtown business section, where this would be impossible.

According to the monthly report of George W. Rounds, superintendent to the Washington Department of Public Works at Olympia, jitney competition is becoming an active factor in cutting down the number of passengers carried and the revenue derived by the Pacific Traction Company and the Tacoma Railway & Power Company on their Tacoma lines.

The month of August which rounded out the first year for the Tacoma Railway & Power Company's city lines under the 10-cent fare, witnessed a decrease in revenues of $15,169.81 from the same month last year. The total passenger fares paid on city lines in August, 1921, was $131,103.88, as against $146,273.69 in 1920. The total number of passengers carried on the city lines in August, 1921, was 2,004,522, whereas in 1920 the total was 2,268,458.

Transportation News Notes

Seven-Cent Fare Stands.—The Public Service Commission of Pennsylvania has dismissed petitions of various Philadelphia improvement associations and civic bodies for reinstatement of the 5-cent fare on Philadelphia Rapid Transit lines. The commission recently ruled that the 7-cent fare would be continued pending completion of valuation proceedings.

One-Man Cars in Use.—The International Railway, Buffalo, N. Y., has started the operation of one-man cars on the Connecticut Street line. The company has rebuilt several of its short double-truck cars of an old type into one-man cars. The Connecticut line is the shortest line in the city and does an extensive transfer business. No opposition developed on the part of the city or the union platform employees similar to the trouble experienced by the company when this type of cars was introduced into Lockport.

Increased Rates Suspended. — The Public Service Commission recently suspended the application for increased rates on the railway in Salem, Eugene, West Linn and Astoria, Ore., until Jan. 1 of next year. The Southern Pacific Company, which owns the lines operating in Eugene, Salem and West Linn, and the Portland Railway, Light & Power Company, which operates cars in Astoria, last July filed tariffs with the commission increasing the prevailing fares from 5 to 8 cents. The commission later suspended the tariffs temporarily, pending an investigation which has not been completed.

Co-ordination Again Urged. — Not until the American railway man understands that the motor bus is not going to replace the railway but merely to help it to operate in thin-traffic routes to a better advantage than on a railway track, the transportation problem will remain unsolved. This opinion was recently expressed by Walter Jackson, electric railway and motor bus expert, speaking before the Boosters' Club at Danbury, Conn., on the subject of "Trackless Transportation." It was on the suggestion of Judge J. Moss Ives that Mr. Jackson addressed the meeting. He praised the service and equipment of the Danbury & Bethel Street Railway and also Receiver Ives' efforts to employ his facilities to the utmost advantage.

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Tenders should be addressed to the chairman of the commission.

Porcelain Insulator Market

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Large Cement Output in September

The movement of portland cement continued on a large scale throughout September, more than 11,300,000 bbl. having been shipped from mills. Shipments of portland cement during the third quarter of the year were approximately 33,970,000 bbl., establishing a record for this quarter. For the nine months ended Sept. 30, 1921, the shipments amounted to 74,045,000 bbl., which exceeds the former record volume moved in the corresponding period of 1920. Favorable operating conditions are indicated by the large September production of 10,027,000 bbl. of finished cement, which established a record for that month. The average daily production was greater than that of August.

Pole Demand Satisfactory

The demand recently for poles of all varieties continues very satisfactory, with jobbers reporting white cedar and chestnut poles as increasingly active. One of the largest jobbers in the South reports the receipt of heavy inquiries for poles from utilities during the past several weeks. Stocks of the better class of poles in that territory are fairly good, with shipments from yards are quite prompt.

In the middle West stocks are heavy and moving slowly. A nominal quotation is $8.60 for a 35-ft., 6-in. top Northern white cedar.

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Buying in the trolley field is quiet and the car building field is not providing anything like normal demand though purchases for ordinary maintenance have been steady. Stocks, consequently, are in good condition both in manufacturers' and jobbers' hands and buyers will find no difficulty in having orders promptly filled.

Large Cement Output in September

The movement of portland cement continued on a large scale throughout September, more than 11,300,000 bbl. having been shipped from mills. Shipments of portland cement during the third quarter of the year were approximately 33,970,000 bbl., establishing a record for this quarter. For the nine months ended Sept. 30, 1921, the shipments amounted to 74,045,000 bbl., which exceeds the former record volume moved in the corresponding period of 1920. Favorable operating conditions are indicated by the large September production of 10,027,000 bbl. of finished cement, which established a record for that month. The average daily production was greater than that of August.

Pole Demand Satisfactory

The demand recently for poles of all varieties continues very satisfactory, with jobbers reporting white cedar and chestnut poles as increasingly active. One of the largest jobbers in the South reports the receipt of heavy inquiries for poles from utilities during the past several weeks. Stocks of the better class of poles in that territory are fairly good, with shipments from yards are quite prompt.

In the middle West stocks are heavy and moving slowly. A nominal quotation is $8.60 for a 35-ft., 6-in. top Northern white cedar.

Rolling Stock

City Council of Seattle, Wash., has enacted an ordinance to appropriate $50,000 for the purchase of municipal buses to serve Cowen Park, South Beacon Hill and other suburban districts. A separate appropriation provides for the purchase of twenty-five new street cars.

Toronto (Ont.) Transportation Commission has received 50 motor cars from the Canadian Car & Foundry Company on its order of 100 motor cars and 60 trailers from that company. The total number of new cars ordered was 210, an order for 50 motor cars having been placed with the Canadian Brill Company.

Nashville (Tenn.) Railway & Light Company lately placed an order with the Nichols-Lintern Company for a small number of mechanical sanders. This order, with others which have been given from time to time, will lead to the total equipment of their rolling stock with sanding apparatus.

United Railways & Electric Company, Baltimore, Md., placed an order this week with the J. G. Brill Company for twenty-two one-man double-passageway improved safety cars. Ten cars of this type were purchased last May and the specifications of this equipment were given in the ELECTRIC RAILWAY JOURNAL for May 14, 1921. This type of car was fully described in the issue for Sept. 10, both as to design and operating features.

Track and Roadway

Hydro-Electric Power Commission Ont. Canada has started work on the extensions to the Windsor Street Railway estimated to cost $900,000.

Jamestown (N. Y.) Street Railway will lay a four-way switch in the center of the city and double tracks will be laid in Main and Third Streets.

Boston (Mass.) Elevated Railway will very shortly begin work on relocating the tracks on Humboldt Avenue. At the same time the city will repair the street.

Sacramento Northern Railroad, Sacramento, Cal., will be rehabilitated if it is taken over by the Western Pacific Railroad. About $3.000,000 will be spent in improving the system.

Cincinnati (Ohio) Traction Company will extend its East End car line to California. Ohio, if the electors at the special election which has been authorized favor the improvement.

Key West (Fla.) Electric Company has relaid the main divisions of its line with 80-lb. 7-in. rails replacing the old 4-in. rail on Simonton, United and Duval Streets.

Cincinnati (Ohio) Traction Company will install new tracks at Liberty Street, Western Avenue and Freeman Avenue to eliminate a bad turn and congestion in that section. The city will pay for the razing of buildings necessary for this improvement.

San Jose (Cal.) Railroad has been granted permission to remove a turnout from the line now operating on East Julian and North Eleventh Streets and to install the necessary equipment for a new turnout on North Eleventh as near as practicable to East Julian.

Pacific Electric Railway, Los Angeles, Cal., has been granted permission to remove its center poles and replace them with span poles to carry its trolley feed and other wires between Orchard Avenue and Normandie Avenue on its Sixteenth Street Railroad line in Los Angeles.

Philadelphia (Pa.) Rapid Transit Company has recently bought about 80,000 Douglas fir ties in the far northwest, and they have been shipped by water to Philadelphia. Owing to the low water rate on shipments of this kind, the ties are said to have cost the Philadelphia Rapid Transit Company only a little more than $1 each.

Interborough Rapid Transit Company, New York, N. Y., will have its line extended from the Grand Central Station to Forty-first Street and Eighth Avenue as soon as the contract for the work has been awarded. Bids for constructing this Queensboro extension will be opened on Nov. 9 by the Transit Commission.

Los Angeles (Cal.) Railway has completed the installation of new track, ties, ballast and pavement on the western section of Washington Street and new ties and ballast are now being installed on the Gage Street line. At Seventh and Main the entire cross track and curve from east to north is being replaced with new material.

Portland Railway, Light & Power Company, Portland, Ore., will complete within the next two months, construction work costing $240,000. The entire Killingsworth Avenue improvement, covering 1½ miles and costing $60,000, will be completed within two weeks. Rebuilding of the west track on Third Street from Washington to Flanders will cost $30,000, while the new bridge over the junction of the Bull Run and Sandy Rivers will cost $150,000.

Toronto (Ont.) Transportation Commission has about 2,000 men laying new lines, changing old ones, installing new intersections and making other betterments on various parts of the system. The Dundas line from Keele Street is the first to be completely overhauled for the operation of the new cars. New intersections have been installed and the operation of the cars started Sept. 24. The Coxwell Avenue extension, which is being built, consists of a new double track, a total distance of approximately 2,400 ft. The existing single track on Gerrard Street north to Danforth Avenue will be made into a double track, with doubletrack Y's at Gerrard Street north to Danforth Avenue, and to connections with the Danforth car house yards, a total distance of approximately 2 900 ft. of single track. The straight track will be laid with 100-lb. A.R.A. type-A rail, on ties and tie plates, on a 9 in. concrete base, with crushed stone cushion. The paving will be granite block with cement grout. The special track work will be A.E.R.A. standard 122-lb. girder and 100-lb. girder guard rail. This piece of construction will connect the Toronto Civic Railway, Danforth Avenue and Gerrard Street lines with the Toronto Railway lines at Queen Street. An intersection has been installed at the corner of Broadview Avenue and Danforth Avenue, to connect the Toronto Railway tracks with the Toronto Civic Railway, Danforth line. A large force is changing the line, repairing the pavement and doing other work on the Bathurst Street line, northerly from its connection with the Dundas Street line. A 0.75 mile extension of the Bathurst Street line to St. Clair Avenue is being built, and it is expected that it will be ready for operation in November. The tracks are being extended on Bloor Street west, from Runnymede Road to Jane Street six blocks, 2,250 ft.

Power Houses, Shops and Buildings

Boston (Mass.) Elevated Railway will open up its new Arlington Street subway station in time for the rush of Christmas shoppers.

Fort Smith Light & Traction Company, Fort Smith, Ark., will add a 7,000-hp. generator to its equipment early next year. The new plant will cost $100,000 and it is expected it will be in operation by March 1.

Indiana Service Corporation, Fort Wayne, Ind., has purchased two 1,000-kw. rotary converters in connection with its new substation. Transformers and switchboards have been purchased from the General Electric Company. The company has also bought three 2,500-kw. 2 300-13,000-volt and three 1,000-kw. oil-cooled outdoor transformers. Outdoor substation equipment has been purchased from the Railway Industrial Engineering Company, which, together with five outdoor oil switches and two outdoor lightning arnester equipments, will make up the outdoor substation structure. The substation cost, including equipment, building and changing feeder circuits, will be approximately $110,000.

Eastern Massachusetts Street Railway, Boston, has recently converted its Quincy Point power house from a coal burning to a fuel-oil burning plant. A contract has been made by the company with the New England Refining Company for approximately 7,500,000 gal. of fuel oil per year for the Quincy plant which supplies electricity for the operation of trolley cars in four cities and nineteen towns on the Bay State System south of Boston. The substitution of oil, the company is convinced, will mean substantial saving in cost, the benefit of which under the service at cost plan will be distributed among Quincy, Brockton, Taunton and Fall River operating districts. The oil burning equipment was installed by the Bethlehem Shipbuilding Corporation.

Toronto (Ont.) Transportation Commission has let a contract to Wells & Gray for the erection of an addition to the Toronto Civic Railway car house, Danforth and Coxwell Avenues, at an estimated cost of $235 000. The extension will consist of three concrete car houses, with provision for offices and stores, and the contract includes alterations to the existing buildins, the plumbing and heating, and the provision of rolling steel doors. The existing car house accommodates 39 cars, and with the extension will accommodate 203. Another contract has been let to Jackson, Lewis Company, for the extension of the St. Clair car houses. The present car houses consist of two buildings, one built in 1913, the other in 1916, each being 200 ft. x 40 ft. with three tracks in each unit, housing altogether 18 cars. With the additions to the buildings and yards, 50 cars will be accommodated inside and 107 outside. The extensions to the present buildings consist of two sheds to the south, 230 ft. x 44½ ft. each containing three tracks at 13 ft. centers. On the north another section will be built, 326 ft. x 44½ ft., containing offices, trainmen's recreation rooms, lavatories, locker rooms, stores, boiler room and a two track repair bay. All the new buildings will be of reinforced concrete, with brick and tile walls. The repair section to the north will have a wood block floor, and one repair track will be equipped with hoisting machinery to raise the cars from the trucks. Wheel grinders will be installed and other smaller equipment for carrying out minor repairs. The whole group of buildings, both old and new, will be sprinklered throughout, and a 40,000 gal. tank will be erected to supplement the city pressure. The storage sheds proper will be open both ends, and each track bay will be equipped with rolling steel doors raised and lowered by individual motors. It is expected to have the new buildings completed by December. The approximate cost is $220,000.

Trade Notes

Edward L. Oerter, comptroller of the J. G. Brill Company, Philadelphia, for the past ten years, has been appointed secretary of the company to succeed Henry C. Esling, announcement of whose death was made in the Sept. 24 issue of the ELECTRIC RAILWAY JOURNAL.

George L. Sawyer, formerly sales manager of the material handling machinery for Barber-Greene Company, Aurora, Ill., has been appointed to represent the Universal Crane Company, Elyria, Ohio in the sale of Universal cranes in the New York field. His offices are at 141 Center St., New York City.

O. B. Frink, assistant principal engineer of the Hall Switch & Signal Company, Garwood, N. J., has been appointed representative of the Waterbury Battery Company, Waterbury, Conn., with office at 30 Church Street, New York City, and S. J. Hough field service engineer at New York, of the Waterbury Battery Company, has been appointed western representative with office at 1361 Peoples Gas Building, Chicago Ill.

Rubber Insulated Metal Corporation, 91 William Street, New York, now has as its president C. T. L. Huston, who was the organizer of the company, and who has taken back the control and management from the Century-Plainfield Tire Company. It is intended to pursue exclusively the manufacture of mechanical rubber goods whereby the Elchemco process is used in the manufacture of Rimco insulation for such articles as pliers, screw drivers, flexible couplings, etc. William F. Hart, who was the sales manager of the company, has resumed his former office. The executive office will be at the previously mentioned address and all business transactions will be handled there.

New Advertising Literature

The J. G. Brill Company, Philadelphia, has just issued a pamphlet which describes the Brill type of electric rail-less cars. including a novel current collector and other interesting features. A description is given also of the control system which consists of a current-relay contact system with a foot master controller.

PEACOCK PROCLAIMS

See What Baltimore Says!

"Baltimore's New Type Safety Cars"

From an Electric Railway Journal story, Sept. 10th.

Type "G" Peacock

". . . Peacock style G hand brakes were used. The brakes on the old cars were not efficient and had to be redesigned, and the experience gained in this regard was used in installing an adequate hand brake on the new cars, with rod connections from the brake staff to the brake beams, instead of cables. . . ."

One of Baltimore's New Safeties equipped with Peacock Brakes

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Bates One-Piece Steel Poles with Ornamental Lighting

This installation illustrates one of the possibilities of combining Artistic Bates Poles with ornamental lighting units.

The excessive number of poles required where trolley conductors and lighting units are installed on separate poles is not only decidedly inartistic, but is also a needless waste of good material. Of course, it is necessary that an artistic steel pole be used for such a combination of purposes.

The series lighting conductor is run from pole top to pole top eliminating the use of expensive, troublesome underground cable.

The use of Bates Permanent Steel Poles with ornamental lights represents maximum economy and the utmost in art.

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Reduce Commutator Wear and Losses Due to "Tie-Ups"

To be absolutely safeguarded against excessive commutator wear—assured of real mileage day in and day out—and to obtain lower operating costs, use

National Carbon Brushes

the brushes that were made to suit the commutator and the service.

You name the job—we'll name the brush

National Carbon Company, Inc.
Cleveland, Ohio

Factors Which Govern the Proper Selection of Rail Joints in Paved Streets

Adjusting insert between rail heads, preparatory to thermit welding—this insert is of similar analysis to that of the rail itself.

(1)—Advantages in the Character of the Joint Itself

The ultimate solution of the rail joint problem is the elimination of all joints by welding.

Unless the rails are *fully* welded, however, i.e., unless the heads of the rails are made continuous, the joint will eventually cup.

The THERMIT INSERT WELD

is the only practical fully-welded joint because of the method by which the weld is accomplished. The super-heated steel obtained from the Thermit reaction is poured into a mold surrounding the rail ends at the joint. This fuses with the base and web of the rail as well as with the lip and one side of the head.

An insert cut from a rolled section of similar analysis to that of the rail itself is placed between the heads at the running face and the lower part of this insert is melted into the Thermit steel. The mold is so constructed, however, that the head of the rail and top part of the insert are not melted but are merely heated to a welding temperature. The sudden expansion of the rail ends caused by the heating action of the molten Thermit steel surrounding them forces them together with tremendous pressure, and thus effects a butt-weld on both sides of the white hot insert.

When this has been accomplished the running face is ground to a true surface and the surplus metal ground out of the groove. The weld obtained in this way is so perfect that it is practically impossible to detect its location after the rails have been paved in.

Let us know the section number of the rail which you wish to weld so that we can ship welding material suitable for the purpose. On receipt of an order for material and apparatus, we will send an expert demonstrator to instruct your men so that you can carry on this work yourselves.

Send for our latest Rail Welding Pamphlet 3932.

Metal & Thermit Corporation

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---Chug-chug-*chug!*---Chuga-chug-*chug!*--- ---Chuga-chug-*chug!*---

That is our attempt to render the song of the Air Compressor under the car.

When everything is right the air receiver is filled up with a few crisp beats of the Compressor.

But when you hear a long drawn out rattle, it is time to investigate.

Maybe there's a leak in the air line. That's easily fixed.

Maybe the compressor is not delivering the full amount of air. That's the time to look after piston rings and most specifically to check up on their clearance.

For if their clearance permits the air to leak past the rings, it's like trying to carry water in a punctured bucket.

If the rings are badly worn there's no cure but new rings.

If the wear is not great, it can be stopped by the use of the correct grade of Lubricating Oil.

This is so. And we have proven it on thousands of cars by providing the right grade of Texaco Electric Railway Compressor Oil.

TEXACO AIR COMPRESSOR OIL, in addition to being a splendid lubricant for the working parts, serves another purpose. It seals the space between the piston rings and cylinder walls. It keeps up compression. It enables the compressor to deliver the full amount of air with each stroke.

And the thing to remember about this air compressor proposition is this: If everything is right it is inclined to stay right. But let the oil be wrong, and conditions get rapidly worse. The air leaks past the rings and oil is carried over. And then you see "smoke" (vaporized oil), and you find carbon. The rings wear and the compressor loses its efficiency. It must operate longer to fill the receiving tank, using up valuable current unnecessarily.

TEXACO AIR COMPRESSOR OILS are clean and highly refined. They minimize trouble due to carbonization, and because of the way they cling to the cylinder walls of the compressor and the piston rings, they maintain compression—promote efficiency and at the same time do not permit an excess amount of oil to be carried over into the air cylinder.

TEXACO AIR COMPRESSOR OILS are tried and tested. We can quote you some splendid records on many Roads in many States. At the same time our Texaco Lubrication Engineers will be glad of the chance to aid you in securing higher operating efficiency through the selection of the right lubricant in the right amount.

There is a Texaco Lubricant for Every Purpose

and they are unexcelled for the Lubrication of Street
Railways, on Rolling Stock, in Power Plant or Shop.

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Standard Helical Gears

Ground Pinion Bores
assure a correct fit on armature shaft and prevent injury to the shaft taper.

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Steel Tires

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"The 'Standard' Brand on your material is an assurance of eventual economy."

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CYPRESS
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because of its being so nearly *rot-proof,* insures a long service-life when used

FOR CROSSARMS, TIES, TRUNKING, CAPPING, FENCING

and other railroad requirements, as a number of the officials of the biggest railways in the country have proved to their entire satisfaction.

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SAVES LABOR COSTS FOR RENEWALS and REPLACEMENTS

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for Safety

Carnegie Steel Company has had long experience in the manufacture of rails, cross ties, rail joints, etc., for track maintenance—also in the manufacture of shapes, plates, bars, wheels and axles for rolling stock.

IN THE manufacture of Carnegie Steel Wheels the steel is hydraulically forged and rolled. The working that the steel receives results in a solid homogeneous structure which insures a wheel free from internal blow-holes and shrinkage cracks so treacherous in cast material.

Another element of safety is in the fact that a Carnegie Wheel is one solid piece having no separate tire or bolts to work loose. It is forced on to its axle under sufficient pressure to prevent its coming off in service.

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WIRES AND CABLES

include bare and insulated conductors of all kinds for all classes of service, also cable accessories.

Catalogues on request.

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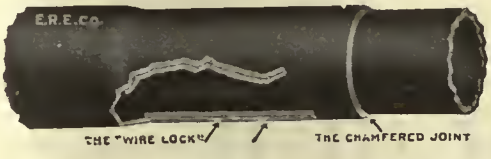

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Lowest Cost Lightest Weight
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Catalog complete with engineering data sent on request.

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Third Rail Insulators, Trolley Bases, Harps and Wheels, Bronze and Malleable Iron Frogs, Crossings, Section Insulators, Section Switches.

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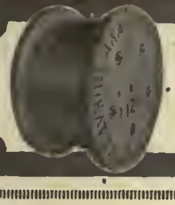

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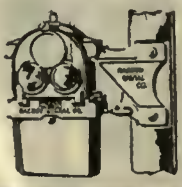

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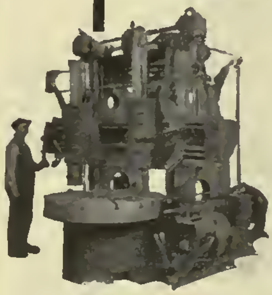

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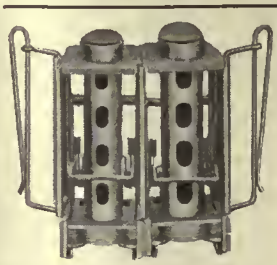

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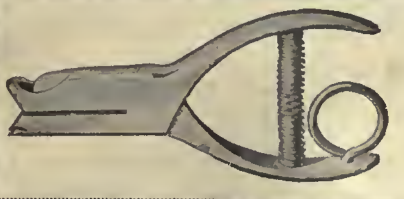

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K	12	25 ft. Double Truck Closed Motor Cars
L	34	30 ft. Double Truck Closed Motor Cars
Q	3	36 ft. Double Truck Closed Motor Cars
T	2	16 ft. Single Truck Closed Trailer Cars
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V	69	22 ft. Single Truck Closed Trailer Cars
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	340	

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The highest or any tender will not necessarily be accepted.

Toronto Transportation Commission

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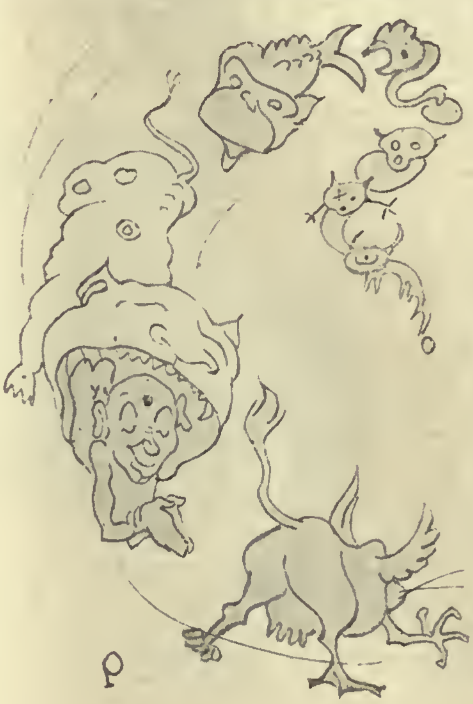

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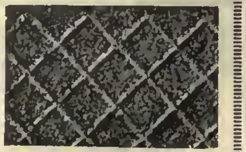

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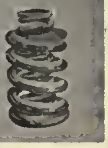

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DAVIS STEEL WHEELS.
Standard for Electric Railway Service
AMERICAN STEEL FOUNDRIES
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Standard for 25 years for car and station steps.
STANWOOD STEPS
Self-cleaning, non-slipping, light weight
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For steel cars—sanitary, fireproof, non-slippery
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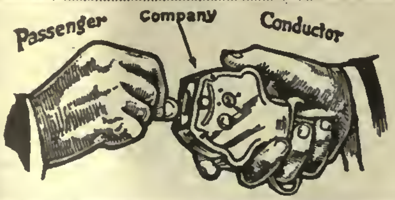

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FORD TRIBLOC
A Chain Hoist that excels in every feature. It has Planetary Gears, Steel Parts, 3½ to 1 factor of Safety. It's the only Block that carries a five-year guarantee.
FORD CHAIN BLOCK CO.
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RAILWAY UTILITY COMPANY
Sole Manufacturers
"HONEYCOMB" AND "ROUND JET" VENTILATORS
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also ELECTRIC THERMOMETER CONTROL
of Car Temperatures.
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Boyerize?

SURE!

There may be room for argument as to whether your service calls for wooden, rattan, or upholstered seats; skip-stops or all stops; orange yellow or pullman green for your car exteriors; fenders or wheel-guards; and so with many other things that affect the comfort, attractiveness and safety of your service.

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You want safety? Sure!

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Better feeling on the part of your motormen and shopmen? Sure! Real dollars made in getting more mileage and spending less on replacements and accidents? Sure!

What's the answer? Boyerize at every point in the trucks and brake rigging where there's wear, stress and strain—"that's all" as those posters used to read.

Boyerized longer-life equipment includes:

Brake Pins and Bushings
Stag Brand Manganese Steel Brake-Shoe Heads
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Boyerized Wearing Plates between the Pedestal Straps and the Journal Box
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To keep up to the highest level

BOYERIZE!

BEMIS CAR TRUCK COMPANY
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"Time to pull out—let's go!"

"Oh, Bill! No handles on this car!"

How often are your cars late in getting out because of misplaced controller and air brake handles—someone has borrowed them during the night to move another car and has forgotten to return them.

Controller — Reversing — Airbrake HANDLES

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Shop Service for Electric Railways

Handles are only one item on the large list of articles we are ready to furnish from our big shop, devoted almost exclusively to electric railway supplies.

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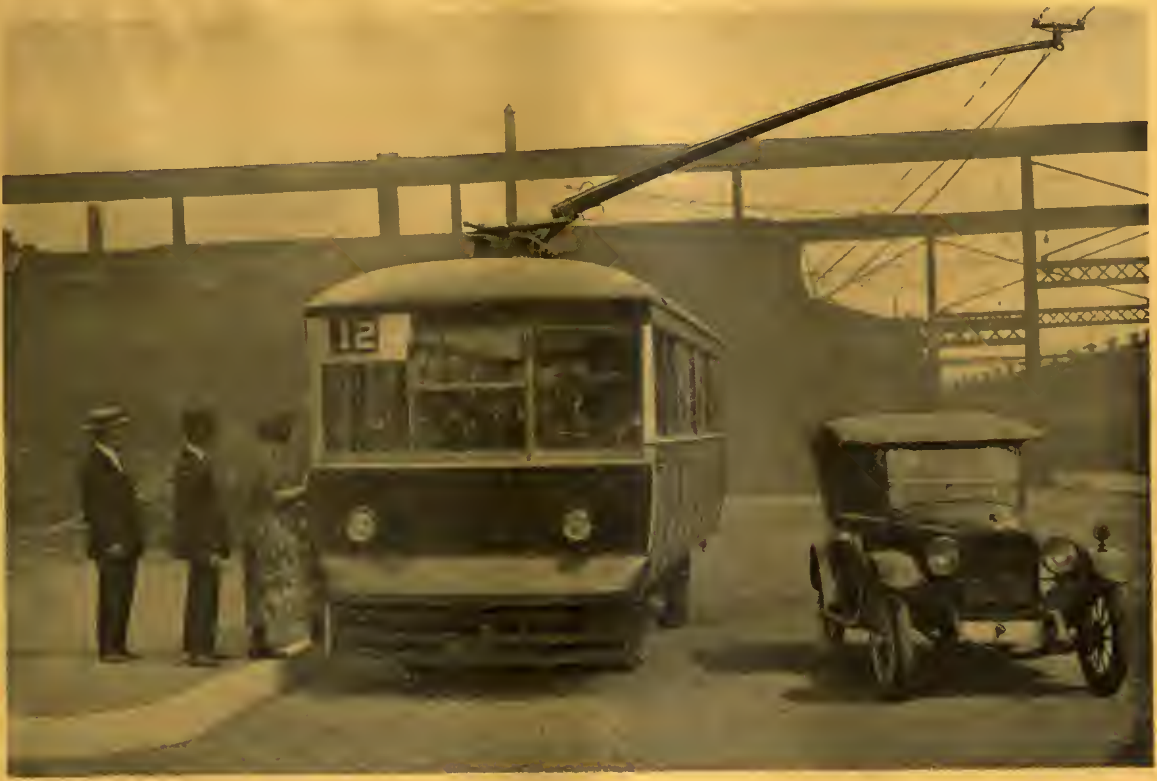

Extend Service with "Rail-less" Cars

Due to its economical advantages the "Rail-less" Car offers an opportunity to electric railways for making badly needed extensions to their service. Also its flexibility, which permits loading passengers at the curb and moving around other vehicles in the roadway, is another feature which will make the service attractive to both the public and operating companies. There is less possibility of injury to pedestrians, such as might occur in street loading, and of delayed service due to an obstruction in front of a car.

The Brill "Rail-less" Car is equipped with a newly developed current collector, which retains an efficient contact with the two overhead wires when the car is as far as 16 ft. off center and permits turning it within a diameter of 40 ft. without disengaging the wires.

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Outside width of body, 7 ft. 6 in.
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Seating capacity, 28.
Weight complete, 9300 lb.

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PHILADELPHIA, PA.

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—and one of the best explanations of its ability to maintain advertising in car card space at the high efficiency so essential to successful operation.

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INCORPORATED
Candler Bldg., New York

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Specially designed and built to suit the particular needs of Public Utility Companies.

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KNIGHT-MOTORED BUS

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As a feeder to electric railway lines, as a carrier in congested areas, it meets every service requirement.

Let our Public Utilities Division help solve your problem. Write for illustrated catalog.

REPUBLIC TRUCK SALES CORPORATION, ALMA, MICHIGAN

The Approaching Winter

Winter with its storms and drifts of snow, ice and slush, tests the stability of even the best electric railway system. Its coming cannot be avoided, but adequate preparation will make its effects less severe.

Wise operators carefully inspect and overhaul their equipments before the beginning of winter, making certain that all units are operating perfectly.

With an ample stock of renewal parts such as spare armatures, armature coils, bearings, brushholders, field coils, resistor grids and control details, necessary repairs during winter operation may be promptly and quickly made, thus preventing serious delays and disastrous confusion.

Westinghouse Renewal Parts guarantee maximum service from equipment when cars leave the repair shop. Their perfect fit and lasting qualities effect a material reduction in annual maintenance expense.

Recollection of the winter of 1919-1920 should prompt all Electric Railways to prepare now

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.
Sales Offices in All Principal American Cities

Westinghouse

Vol. 58, *No.* 18 New York, October 29, 1921 *Pages* 763-806

Electric Railway Journal

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing-Editor

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Regulation of the Public Utilities in Wisconsin

The power of Wisconsin's Railroad Commission strengthens utility securities in that state. Adequate revenue in return for satisfactory service gives Badger State a perfect record in number of utility receiverships. "Efficiency wall and Stocks, and defends the figures of Mr. Thirlwall..........Page 769

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H. L. Andrews compares estimates on operating costs of motor bus, trolley bus and safety car, as given in recent articles in this paper by Messrs. Thirlwall and Stocks, and defends the figures of Mr. Thirlwall ....Page 769

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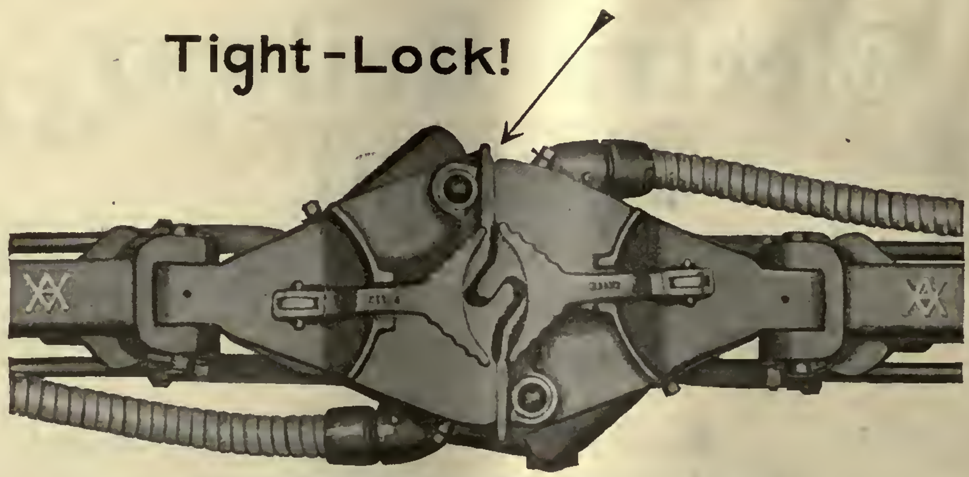

Car, Air and Electric Coupler

AUTOMATIC type K-1-A

Coupler Head, Showing Electric Portion and Lock Reset Trigger.

THE K-1-A does just what it was always hoped an automatic coupler would do.

Its complete practicality is vouchsafed by electric railway officials who have adapted it to their operations, subjecting it to the actual test of hard, every-day service over a period of years.

Three operations in one—the impact of the couplers locking the cars securely together; establishing rigid, tightly-sealed air connections, and forming electric connections with clean contacts which insure full carrying capacity without over-heating.

Designed in the interests of HUMAN SAFETY and TIME ECONOMY. Adapted for multiple motor, or motor and trailer, operation.

The K-1-A can be furnished with or without the electric portion, provision being made so that this feature may be added at any time.

Send for new Descriptive Catalog Unit T-2029

Heads Ready to Couple.

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The Supreme Test—

NEW YORK TRAFFIC

Successfully Met by

the SAFETY CAR

TWO years' service in the congested traffic of Greater New York has been the supreme test of the Safety Car. First it won success as a distinctly advantageous form of transportation for the small or medium-sized community. Then it was "drafted" to meet the serious conditions which developed in many cities of 100,000 to 200,000 population. Now it operates across Brooklyn Bridge, in the midst of the rush and turmoil of New York's seven million.

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The size and population of the territory served has no bearing on the question of whether the Safety Car will prove a profitable investment—It has never failed yet.

In use on 340 railways in the United States, Canada, Mexico and Cuba.

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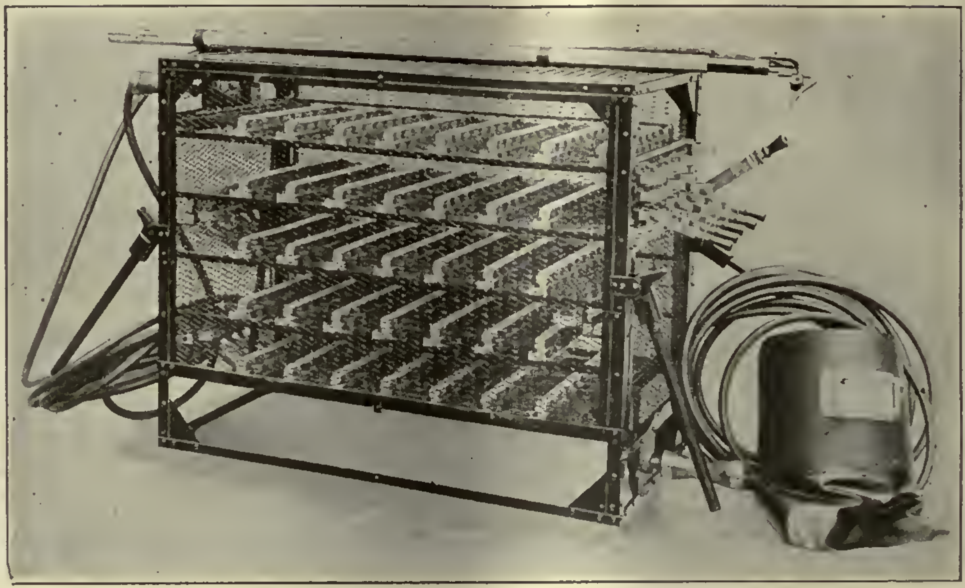
CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH

It is not a safety car unless equipped with our standard Air Brake and Safety Car Control Devices.

"Any road is large enough to have one"



Ajax Electric Arc Welder

No Road Is Small Enough To Do Without One or More—

Says William R. Dunham, Jr., writing in the *Electric Railway Journal* on the functions of the track department in relation to selling transportation—"...... *any road large enough to operate cars is large enough to have at least one welding and grinding outfit, providing it wishes to sell transportation by means of smooth riding track, and if properly handled such an outfit makes for economical track maintenance."*

The Ajax Electric Arc Welder is a lightweight, easily portable outfit. Because it can be used successfully by the ordinary intelligent track man without any special skill or training, and because it is extremely simple and rugged, reducing maintenance to a minimum, it is a most economical equipment to use.

Your road literally cannot afford to carry on track repairs without this handy apparatus.

Universal

Rotary Track Grinder

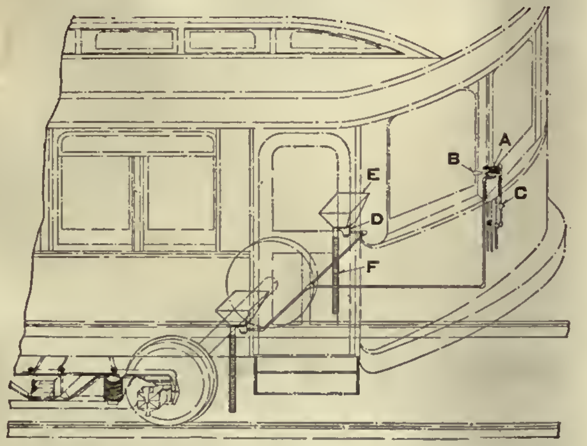
For finishing-off, after welding repairs are complete, the Universal Rotary Track Grinder is a machine which has come into most general use on electric railway track work. It has a tilting grinding wheel, which can be adjusted to the original angle of the rail head.

RAILWAY TRACK-WORK COMPANY

3132-48 E. Thompson St. Philadelphia, Pa.

Here's Safety for Slippery Streets

With O-B Air Sander Equipment you can have a sanding system on your cars which is positive—and yet economical of air.



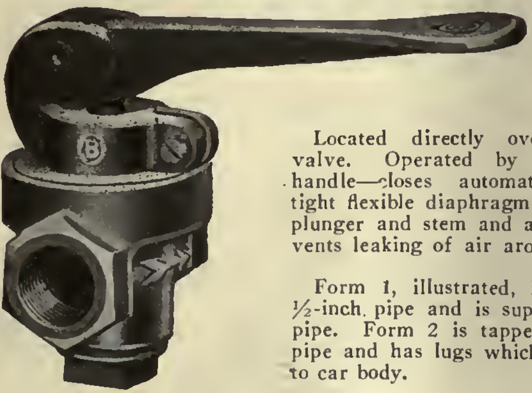
How O-B Air Sander Equipment is installed. "B" is engineer's valve handle. "E" is a hopper which may be built in any convenient point near the wheel.

"D"—O-B Air Sand Trap

A compact trap which fits in any corner where it has to go. Won't let sand through except under air pressure. Full, curved passages let sand flow freely under pressure. 2-inch, sherardized, clean-out plug in bottom. Threaded for ¼-inch air line. Spout of Form 1, illustrated, is equipped with studs to hold 2-inch sander hose. Form 2 spout is threaded for 1-inch pipe coupling.

"A"—O-B Air Sander Valve

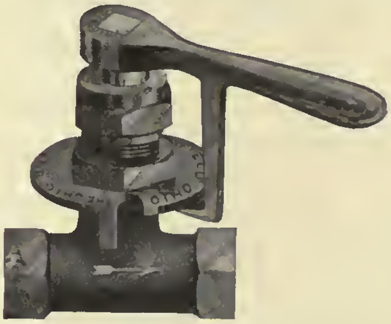
Diaphragm Type—Patented



Located directly over engineer's valve. Operated by pressing the handle—closes automatically. Air-tight flexible diaphragm separates the plunger and stem and absolutely prevents leaking of air around the stem.

Form 1, illustrated, is tapped for ½-inch pipe and is supported by the pipe. Form 2 is tapped for ¼-inch pipe and has lugs which are screwed to car body.

"A"—O-B Independent Air Sander Valve



Opened or closed by turning handle. Tapered seat gives close regulation of air flow and positive shutoff. Handle is removable for double end operation, but can be taken off only when valve is closed.

"F"—O-B Wire Sander Hose

Can be located to drop sand on the rail always—even on curves.

"C"—O-B Air Reducing Valve

Limits, to any desired pressure, the amount of air which flows when the sander valve is wide open.

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San Francisco Paris, France

Products: Car Equipment; Trolley Material; Rail Bonds; High Tension Porcelain Insulators; Third Rail Insulators.

Insurance plus
Marsh & McLennan Service

We care for the insurance of many of the largest electrical corporations and traction lines. We would be pleased, on request, to furnish you with the names of some of these corporations from whom you can obtain information as to why they placed their business in our care.

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DO the Ties in your track foundation absorb water to freeze and start cracks in the foundation concrete? The action may be slow but it is inevitable if your ties are wood.

STEEL TWIN TIES reinforce the track foundation concrete as all permanent concrete structures are reinforced. This advantage is obtainable at a large saving in first cost over wood-tie construction.

The complete data are arranged for a permanent place in your files. *Ask for it today!*

THE INTERNATIONAL STEEL TIE COMPANY, 16702 Waterloo Road Cleveland, O.

Manufacturers of Steel Twin Ties and Crossing Foundations

International Steel Twin Ties manufactured and sold in Canada by Sarnia Bridge Co., Ltd., Sarnia, Ont.

Steel Twin Tie Track

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Standards!

Standard equipment for standard safety cars means—"H-B Life Guards included."

PROVIDENCE FENDERS

For the large interurban car, Providence Fenders give adequate protection on paved city streets, and are, moreover, ideally suited for open track conditions in suburbs and country districts.

The Consolidated Car Fender Co.
Providence, Rhode Island
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You're the Judge

TRY THIS CASE

KEYSTONE

It's a Light Steel Gear Case riveted and spot welded.

Its light weight multiplied by the number of cars you operate will total a figure that will prove interesting alongside the total weight of cast iron cases your power has to move.

Try this oil-tight, dust-proof, reinforced KEYSTONE GEAR CASE and see for yourself why we call it *"a real case of real service."*

Made for use with all types of motors.

Remember, now, these points

Steel, Riveted, Welded, Light—Strong, Rigid, Durable, Tight.

ELECTRIC SERVICE SUPPLIES CO.

Manufacturer of Railway Material and Electrical Supplies

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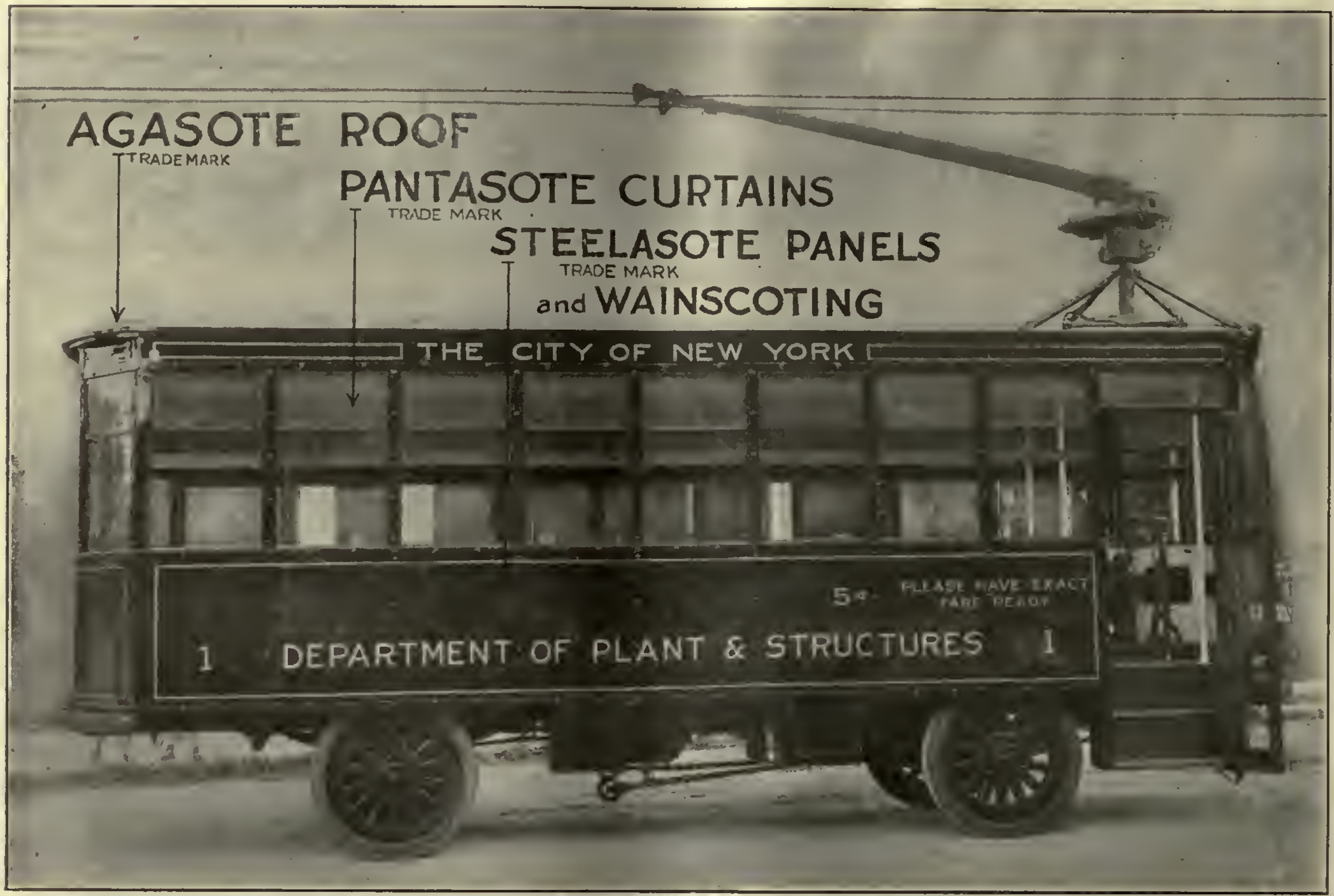
CHICAGO
Monadnock Block



The eight new trackless Trollibuses

AGASOTE ROOF
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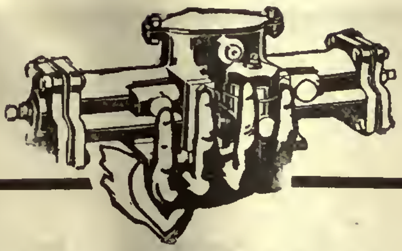

Modernize!

Use the National Pneumatic Line to make Train Operation Fully Down to Date

Says G. M. Woods in the Sept. 10, 1921 *Electric Railway Journal:*

"The tendency in street railway practice is toward train operation for heavy traffic."

". . . .operators who heretofore have consistently favored single-car operation now feel. . . . . .train operation is the only solution of their traffic problems."

"Undoubtedly a reduction in the number of units reduces the congestion."

". . . .a two-car train will cross a street intersection just as quickly as a single unit."

Mr. Woods capably develops the argument that multiple unit train operation is the best kind and that it "rarely will be found to exceed that of train operation."

Train operation can do so much to increase track capacity that it pays to use each and every improvement that will put off the far greater costs of re-routing, street widening and tunneling; and that will give at once substantial savings in platform and accident expense with improved collection of fare.

That's why the equipment of surface car trains with better motors and control has been and is being accompanied in so many cities by that group of time-cutters known as the

National Pneumatic Line

Door and Step Control
Motorman's Signal Lights
Door and Step Operating Mechanisms
Safety Interlocking Door Control
Multiple Unit Door Control

You need one or more of these specialties whether you are operating cars singly or in multiple. Let us co-operate with you *now* to avoid costly changes later.

Manufactured in Canada by
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Street Railways to Prosper Says Babson

Notwithstanding the general impression that street railways have seen their best days, the industry is one of the biggest in America. In fact, it is within the group of less than a score whose sales amount to over a billion dollars a year. When you stop to realize that this billion dollars is collected in nickels and pennies, this means that the various systems carry about twenty billion passengers each year, or that every man, woman and child in the United States averages to ride about 200 times every 12 months.

Of all the large interests it is the one which pays the most to labor. Forty-six cents of every dollar goes to the employees. Furthermore, it has the smallest percentage of profit. Only two cents of the dollar goes to those who furnish the money. It is the one industry closest to the masses.

It is the common opinion that Henry Ford and other automobile manufacturers have put street railways on the rocks. In a few sections of the country this is true; taking the United States as a whole it is not true. There are more street railway riders today than ever before. Statistics show that there is even more riding per capita today than there ever has been.

The difficulties of the street railways have come during the past few years from the increase in the cost of labor, material and operating expenses in general. Now that these expenses have turned the corner and are going downward, the street railway industry will automatically become more prosperous. This means just one thing—street railway bonds as a class will go up in price.

From paper read by Roger W. Babson
before recent A. E. R. A. Convention.

ELECTRIC RAILWAY JOURNAL, 10th Ave. at 36th St., New York, N. Y.

Standard Helical Gears

Rounded Teeth form a ready means of identification and eliminate sharp corners.

Tooth Design

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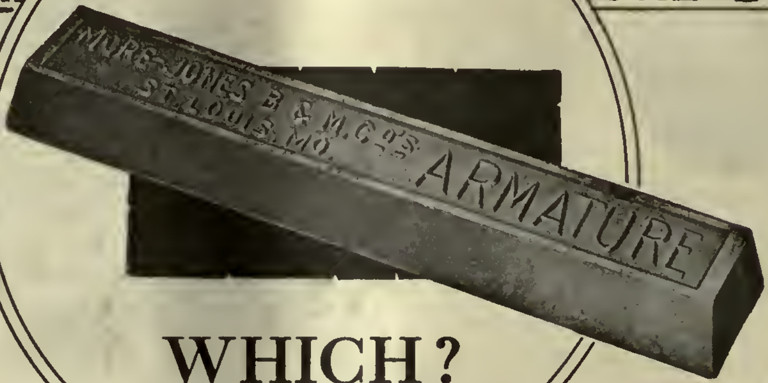

WHICH?

YOU can purchase a babbitt at any price you care to pay. No doubt we could supply it from our line of 23 various brands. However, each grade was designed for certain requirements.

MORE-JONES Armature Babbitt is particularly adapted for Electric Railway armature bearings. While cheaper, lower grade alloys will do very well for some work, unquestionably MORE-JONES Armature insures maximum service at minimum cost, when employed for the purpose recommended. That accounts for its widespread use on Electric Railways in the United States today.

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are oils made by Galena process from the finest stocks obtainable, built with the care and precision that insures uniformity. In hundreds of power houses they are delivering exceptional service and demonstrating their economy by their longer life and body-holding properties.

GALENA QUALITY

is the heritage of over fifty years of experience in the development and improvement of railway equipment lubrication, a business that this company has, through specialization, reduced to a science.

It is our absolute and unwavering confidence in Galena Quality that enables us to *guarantee* the delivery of stated service from these oils, by written contract—a condition that manufacturers of the lower grade products have found by experience they are unable to meet.

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A rail as long as the system and without a joint would be ideal for the power service of a street railway

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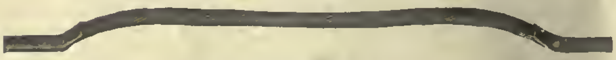
For attaching to
Rail Head

SF-4 Arc Weld Bond
For use with Weber Joints



SF-6 Arc Weld Bond
For attaching to rail base

Making Tracks "Jointless" with G-E Welded Bonds

Welding a bond to a rail today need not be the troublesome task of fusing copper with steel. G-E Rail Bonds have steel faces expertly arc welded in the factory to drop forged copper terminals. Thus a track welder merely makes the perfect steel weld he is used to, and the bond becomes an integral part of the track.

G-E Welded Rail Bonds, either U-shaped for rail heads or of the flexible, long type for spanning splice bars are the outgrowth of broadest experience in railway work. They can be supplied in forms to satisfy any need.

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Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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Mail Pay on a Better Basis Than Formerly

ONE of the striking evidences of the value to the industry of association work is shown in the services performed by the mail pay committee, whose report for the last year was presented at the Atlantic City Convention and was abstracted in the Oct. 8 issue of this paper.

Under the old mail pay committee, as many members of the industry know, a substantial step forward in the fight for fair and compensatory rates of pay for mail carriage was made. Perhaps this is best indicated by the fact that after the decision of the Interstate Commerce Commission was handed down, the appropriation to the Post Office Department for mail carriage by electric lines was increased from $545,000 to $707,000 or by $162,000; that is, 30 per cent.

During that struggle the committee succeeded in getting the question of side and terminal service eliminated as a burden to the carriers. The commission also established the principle of limiting the number of pouches of mail, or pieces of parcel post, that could be carried on cars for a flat rate per mile. In other words, the Interstate Commerce Commission put the mail handling on a space basis.

Those of the industry who are familiar with the burdensome restrictions that were imposed by the Post Office Department rulings on these two matters of course recognize that a real victory was obtained in the decision of the commission, and the mail pay committee and the member companies represented by them are entitled to congratulations for such success as crowned their efforts.

As indicated in the report presented at the convention, however, the mail pay committee is satisfied that the new rates are not fully compensatory. Therefore it recommended to the association that the fight for justice be carried on still further and this recommendation was approved.

Since the change in administration in Washington last March, a different spirit has prevailed in the councils of the Post Office Department, and the committee, as the report indicated, has received the promise of co-operation by the Second Assistant Postmaster General to the end that the facts, as ascertained by the data sheets and other study, can be agreed upon in advance. This is a businesslike way of approaching the subject as it will eliminate the necessity for a long drawn out and tedious series of hearings and will enable a much more efficient and concise presentation of the case before the commission for argument. The plan should permit the committee so to put forth its arguments and conclusions that further relief ought to ensue when the Interstate Commerce Commission decides the case.

The matter is being referred to here editorially, as indicating one of the many lines of productive activity engaged in by the American Electric Railway Association and its committees, and one that should, if a successful termination is reached, mean still more revenue to those companies which are now burdened with the carriage of the mails.

Furthermore, under the present law, it is understood that the Post Office Department has the right to demand the carriage of the mail by any electric railway. Therefore, all electric railway companies, whether members of the association or not, have a potential interest in the work of the committee on mail pay, because they might at any time be required to carry mail, and, even at the present rates, most companies would carry the mail at a loss.

There is ample justification, therefore, in this situation for the industry to put united support behind the mail pay committee in its efforts to lighten the burdens laid heretofore upon many of the companies by the Post Office Department.

Does Engineering Training Fit for Management?

DOES an engineering education fit or unfit a man for executive leadership? This, after all, was the question at issue in several addresses at a joint meeting of engineers held in New York on Oct. 19. On the one side the charge was made that the habit of mind of solving problems with mathematical exactness followed by the engineer was incompatible with, or usually not accompanied by, that vision of possible future growth which is necessary in large undertakings or the faculty of establishing good relations with employees and the public. To quote the advocate of this theory, Mr. Cabot, a Boston banker:

"His [the typical engineer's] natural position is that of the hand which executes rather than the mind that conceives. Leadership is not native to him, his enthusiasms have been put under stern control, locked up so that they cannot warp his judgment—they cannot easily be released to inspire others. In fact, they are often atrophied. . . . I do not believe that it is impossible for an engineer to be a great leader and manager of industry. All that I maintain is that his natural handicap is increased by our present methods of training to such an extent as to make him an unpromising candidate for promotion to such positions, and I say this with full knowledge of the fact that his selection to fill them has become increasingly common of late years, especially in public service corporations."

In defense of this theory the achievements of Vanderbilt, Hill, Carnegie, Schwab, Gary, Ford, Westinghouse, Coffin, Vail and others were cited. Particular mention was made of the record of T. N. Vail, whose successful direction of the A. T. & T. was declared not to have been equaled during the past seven years by that of the management of any other utility or group of utilities.

So much for the prosecution. On the other side, there were not lacking defenders of the engineers, who declared that it was the engineer whose exact training was often required to rescue and rehabilitate a utility or other enterprise after the promoters and their financial backers with their impracticable ideas and schemes of high finance had brought the property into financial difficulties.

Of course it would be improper to ignore the merits of each type of mind. Our great utilities and industrial enterprises would not be in existence but for the enthusiasm, creative genius and courage of the pioneers. Much of the practice of anticipating development and building for the future could well be copied by some of their more prosaic successors. But the present time particularly calls for executives who, while having a vision, can tell whether that vision is real or imaginary, is an oasis or merely a mirage, and that their paths are being directed by a beacon and not a will-o'-the-wisp. The modern president of a utility must be economical but ready at the same time to spend money when the conditions warrant. He must understand how to deal with men as well as with materials.

Not all engineers—perhaps it can be said not many engineers—can do this, but their percentage of failure probably is not as great or no greater than among the non-engineers, including among the latter the bankers. There is nothing in the study of engineering itself which should preclude the broader knowledge required to conduct large enterprises successfully. Rather, engineering education should train a man to substitute judgment based on knowledge for haphazard guess based on surmise or intuition. There are many conspicuous examples of men with engineering training who have directed or created large undertakings. The names of George Westinghouse, General Goethals and Herbert Hoover will occur to the mind at once as notable instances. In the public utility field there are of course many notable examples whom it would be invidious to mention, yet their names will recur to everyone.

After all, the lesson for engineers is not that their training will prevent them from high executive service. Rather, it is that it will help them, provided it is combined with courage to make decisions, insight into the probable future development from a given set of conditions, and ability to judge men and get along with them.

The "Electric Railway Journal" and Bus Transportation

FOR several months, if not for years, there has been an increasing demand upon the editors of the ELECTRIC RAILWAY JOURNAL to keep the electric railway field informed upon developments in bus transportation. It has been recognized for some time that this newly-developed agency must be a permanent factor in urban and interurban transportation of passengers, and there has been an earnest desire on the part of most railway operators to be informed about its potentialities and accomplishments for the double reason of knowing how to meet the new agency in competition and how to use the new agency in co-ordination with existing rail systems.

It is of value to make or obtain actual analyses of cost of operation of various trackless vehicle installations for the edification and education of the operators of these systems and for those who would undertake such operation. The leading operators of such systems, as well as railway men, are in thorough sympathy with such a program for they both are anxious to know exactly where the bus is going to fit in ultimately in the passenger transportation business.

The bus manufacturer is also vitally interested in all these matters. He wants to work closely with the operator to determine the fundamentals of design that will insure the most economy in operation. There must be considerable research and expenditure of money before there is any degree of finality in bus design principles. Some special designs have been developed, though some manufacturers still hold to the use of the standard truck chassis.

In response to the evident need of editorial service in this entire bus problem, an effort has been made during the past months to supply it. All of the studies which have been made and data which have been collected tend only the more firmly to fix the idea that the best transportation for the community can be obtained only by the co-ordination of the various transportation facilities and not by indiscriminate competition. That buses should be regulated in the same manner as railways should be is a principle which is admitted and even encouraged and sought by leading bus transportation operators.

However, the numerous problems of the railways, coupled with the increasing interest in the problems of the bus transportation field, make it almost impossible to give adequate treatment to both in the somewhat limited space available in the ELECTRIC RAILWAY JOURNAL. Accordingly, it has been decided to try to give a special service on bus transportation in a monthly supplement to the ELECTRIC RAILWAY JOURNAL. This supplement, according to present plans, will make its appearance in January, 1922, and will be known as the "BUS TRANSPORTATION JOURNAL section of ELECTRIC RAILWAY JOURNAL." It will be edited by the same group of editors now responsible for this paper and will be coordinated in its editorial policy in exactly the same manner that it seems desirable to co-ordinate the bus transportation service in the field with electric railway service; namely, to give the best complete service by a co-ordinated unit. This undertaking is being started only after consultation with several leaders in both the electric railway and the bus fields, and the general opinion expressed was that this plan is the best to provide the desired service.

In the manner proposed, the information on all bus transportation questions, no matter what form of drive is used, will be available to all electric railway men who are interested in the subject and will also be available to those interested in the operation of bus systems, whether or not they are interested in electric railways. It must be recognized that there are many small communities and many interurban transportation routes which, even in the days of wildest dreams for electric railways, could by no stretch of the imagination support a rail system but in which there is now a demand for some sort of transportation which the bus can supply. This field has never been served by any publication from a transportation standpoint, but this service the BUS TRANSPORTATION JOURNAL will be able to perform.

The ELECTRIC RAILWAY JOURNAL and the BUS TRANSPORTATION JOURNAL, therefore, as a unit, hope to cover the urban and interurban passenger transportation field, in so far as it is served by responsible transportation agencies. The effort is thus merely a continuation, with expansion, of the past efforts of the ELECTRIC RAILWAY JOURNAL to assist where it can in the solution of urban and interurban transportation problems and in the upbuilding of the industry created and operated for the purpose of supplying such transportation.

THE COMMISSION IS HOUSED VERY EFFECTIVELY IN THE STATE CAPITOL

Regulation of Utilities in Wisconsin

Power of Wisconsin's Railroad Commission Strengthens Utility Securities in That State—Adequate Revenue in Return for Satisfactory Service Gives Badger State a Perfect Record in Number of Utility Receiverships—"Efficiency Instead of Politics" Is Keynote of Commission's Success

THE confidence which Wisconsin holds in its Utility Commission is clearly expressed by a decision of the Wisconsin Supreme Court rendered in the last few months, from which the following extract was taken:

> The commission legislation has been welcomed by the public and the public utility companies alike. It has never been suggested that the purpose of the legislation was other than for the promotion of the public interests. Critics should appreciate that private capital devoted to public service is entitled to a fair return and that it requires more courage to render just than popular decisions. It is believed that fourteen years of experience has vindicated the law as a measure of great public benefit, although recently, when abnormal industrial and commercial conditions have given rise to a general increase in rates of service, mutterings against the law or its administration may be heard. But it should not be forgotten that successful regulation must be fearless and fair and accommodated to the exigencies of changing conditions. Whenever the administration agency appointed to arbitrate between the public and the utility is influenced by public sentiment rather than considerations of justice, the purpose of the law will fail, not because of its infirmities but because of its weak and servile administration.

The origin of regulative legislation in Wisconsin came in 1874 under pressure of the so-called Granger legislation when a board of three railroad commissioners was appointed by the Governor. This board lasted two years and did some splendid pioneer work, being replaced in 1876 by a single commissioner. This system was continued until 1905, being changed from an appointive to an elective office in 1881. This railroad commissioner was required to make inquiry regarding neglect or violation of laws by the railroads, inspect and examine the condition of railway equipment with reference to public safety and convenience and report all existing violations to the attorney general for action. The power of the commissioner ceased there, for the attorney general acted on the complaints by issuing recommendations to the railroad company involved, which recommendations were final unless reversal was obtained by an appeal to the court. This unique feature distinguished the old regulation from the new in Wisconsin. Incomplete and ineffective as this method now appears, it nevertheless marked progress in that line. The Wisconsin law was upheld by the Supreme Court of the State in 1874, in one of the first cases, if not the first case, of a higher court recognizing the right of railway regulation by the State (Ryan decision—June, 1874), and this case, with similar ones arising about the same time in Illinois, was upheld by the United States Supreme Court in 1876. (Otto, U. S. Rep., Oct., 1876.)

The next important event in the history of State regulation occurred in 1901 when a constitutional amendment provided that it was illegal to grant passes; this was followed in 1905 by the initial draft of the final bill making a railroad commission for Wisconsin.

Amendments to this law appeared as the necessity demanded in 1907, 1909 and 1911. This commission consisted and still consists of three members appointed by the Governor and confirmed by the Senate, the term of office being six years, expiring serially.

The personnel of the present Railroad Commission of Wisconsin composes the following: Carl D. Jackson, chairman, an attorney; Henry R. Trumbower, a political economist, and Lewis E. Gettle, an engineer. The secretary of the commission, C. D. SeCheverell, is the executive head of all other employees. The staff, under his direction, is divided into four departments, headed as follows: (1) Engineering—C. M. Larson, (2) Statistical—G. C. Mathews, (3) Service—C. B. Hayden, (4) Traffic—R. V. Adams.

THE PECULIAR UNROOFING OF THE CAR PERMITTED PASSENGERS TO BE REMOVED WITHOUT SERIOUS INJURIES

Slack brakes coupled with some inattention on the part of the motorman were officially reported by the commission in connection with this accident in Milwaukee on June 5, 1919, in which more than seventy persons were injured.

Most of the states, with the necessary exception of Massachusetts, on account of a prior law, have followed closely the modeling of the Wisconsin law, but until very recently under no other commission are so many classes of utilities included. Some of these State commissions have powers somewhat similar to those conferred on the Wisconsin commission. These include the regulation of almost all phases of the operation of the following:

Steam railroads,
Electric urban and interurban railroads,
Express companies,
Sleeping car companies,
Freight companies,
Telegraph and distribution messenger companies,
Companies or individuals doing transportation business over any railroad in the state,
Common carriers engaged in passenger or freight transportation partially by rail and partially by water,
Telephone utilities,
Gas utilities
Electric lighting utilities,
Water utilities,
Heating utilities,
Toll bridge utilities.

Municipal and privately owned utilities under the Wisconsin law are placed on the same basis as regards commission control, a most excellent provision, as it prevents certain unfair comparisons which are often made between the two types of ownership. Provisions of this law which may be especially noted concern:

1. Joint use of property,
2. Valuation of property,
3. Uniform accounting systems,
4. Commission's reports,
5. Depreciation,
6. Service standards,
7. Complaints,
8. Court review,
9. Franchise and indeterminate permits,
10. Anti-free service.

In general the public utilities law can be rated in short but comprehensive form as follows:

> The Railroad Commission of Wisconsin is vested with power and jurisdiction to supervise and regulate every public utility in this state and to do all things necessary and convenient in the exercise of such power and jurisdiction. (Section 2, Public Utility Law—1797 M.)

Due to the abnormal economic conditions created by the war, the recent work of the commission is marked by two general characteristics: First, the relatively small number of cases involving railroads, due to federal control; second, the excessively large number of utility cases handled, most of which involved increases in rates. This is shown very forcibly by the accompanying chart.

The largest number of cases was handled in 1920, but any present decrease in the number of other cases will be more than offset by the increase in railroad cases that are following the resumption of full private control and operation. Moreover, since market conditions show a marked decline, there will be an increase in utility cases involving decreases in rates, which will tax the commission's capacity greatly.

TABLE I—INCREASE IN UTILITY INVESTMENTS IN LAST TWO YEARS

	1919	1920
Common stock	$883,592	$5 381,843
Preferred stock	1,040,600	3 372 600
Bonds	16,708,000	39,785 233
Notes	5,494,000	11 098,075
Equipment trust certificates	....	32,127,109
	$24,126,192	$91,764,860

The outstanding features of these increases in investments are: (1) Practically all of this stock has been sold locally to their customers, (2) A large amount of temporary financing by the issue of notes and other short-term securities has been done by the utilities, due to a desire to avoid long-term securities at the abnormal high rate of interest which has prevailed during the last two years.

The electric railways showed an increase in investment and revenues, although the increase here was not so rapid as in the case of other electric utilities. Operating revenues show the effect of increased rates of fare, many of which were effective during 1919. Though showing an increase in greater proportion than the increase in investment, the total operating expenses increased at an even greater rate. The year 1910 showed a return of 6.5 per cent, 1914 a return of 5.6 per cent and 1919 a return of 1.9 per cent.

The number of utilities, of which the commission has a record, increased each year notwithstanding consolidation:

TABLE II—PUBLICLY AND PRIVATELY OWNED UTILITIES UNDER THE JURISDICTION OF THE WISCONSIN COMMISSION

	Municipal	Private	Total
Classification:			
Electric	107	217	324
Gas	2	33	35
Water	121	26	147
Street railroads	...	25	25
Heating	...	12	12
Toll bridge	...	8	8
Total utilities	230	321	551
Telephone	...	982	982
Grand total	230	1,303	1,533

ENGINEERING DEPARTMENT

The engineers serving the Railroad Commission are organized as the "railroad and utilities division" of the State Department of Engineers. This division not only performs such duties as may be assigned to it by the Railroad Commission, but its members are available for service to other state departments upon call by the State chief engineer.

The activities of this department may be classified roughly under two headings, namely, valuation of public utility property, and inspection or supervision of service rendered to the public by the utilities. The engineering activities can be briefly outlined as follows: I—Public utility service; II—railroad construction and service; III—public safety; IV—physical property valuation; V—water power; VI—jitney regulation; VII—miscellaneous problems of engineering.

I—PUBLIC UTILITY SERVICE

"Service" is the watchword of the Wisconsin commission. By this the entire utility field is dominated and regulated. When the commission seeks to investigate a rate, the service of the utility in question is carefully analyzed and the rate established on that basis. The analysis and inspection to determine these grades of service form a very important part of the commission's activities. The inspection service is very detailed and precise. Standardized service, with a rating for every utility, is the object. To that end one chief method is used. An inspecting department is provided which is continually on the alert for betterment of service, using standard forms for the grading of each branch, such as electric, telephone, and gas. These reports form the basis for an actual compilation of rating data. These data were primarily for the use of the commission, but recently they have served a twofold purpose. Being made public, a keen competition was created among the utilities, resulting in a noticeable betterment of plant and operating conditions. Finally it can be said that the rate-making of the commission is based on service rendered and is also essentially *"A cost plus a reasonable profit on the physical property used and useful."*

TABLE III—UNIQUE RATING SCHEME ADOPTED FOR THE COMPARISON OF UTILITIES

	1918	1919	1920
Electric	76 1	75.4	76 2
Gas	75 9	77.1	73 3
Telephone	79 5	....	78 5

The average ratings of the utilities for years up to 1920 are as shown in Table III.

Incorporated in the records of the service department are complete files of photographs showing conditions of service and maintenance for different utilities, which offers tangible evidence for considerations of rates. These show to what exact degree the service is watched by the commission. For further ease of control the State is divided into four districts with resident engineers in each at the following district capitals: Northeastern, Eau Claire; northwestern, Appleton; south-central, Madison; southeastern, Milwaukee.

II—RAILROAD CONSTRUCTION AND SERVICE

During the control of the steam railroads by the government very little was accomplished by the State commission except to a slight degree in means of co-operation with the Interstate Commerce Commission. A gradual increase in activity, however, followed the return of the railroads to their former owners.

It is particularly interesting in city railway development that the first zone-fare system ever put into effect came under the supervision of the Wisconsin commission in 1914 in the city of Milwaukee. This fare system proved its worth by actual use and is now in operation under the same rules. The system divides the city into several zones, a central and outlying zones. A flat rate of 7 cents is the present fare for travel, in each zone, while a fare of 3 cents is charged for each additional zone traversed.

Rolling stock equipment on all electric railways is maintained in a good operating condition by careful supervision. Plans for additional new equipment as well as for major alterations must be approved before being put into effect.

III—PUBLIC SAFETY

With a view toward securing uniformity in methods of protection, the commission, in co-operation with Illinois, Minnesota and Indiana, has arranged a set of rules governing the construction, maintenance and operation of interlocking plants for railways. These rules contain rigid requirements pertaining to any change in signaling plants and specify approval of all new installations by the commission. They also contain strict requirements for inspection service.

AN EXTENSIVE INVESTIGATION OF THIS RAILWAY ACCIDENT IN MILWAUKEE WAS MADE BY THE ENGINEERING DEPARTMENT

Considerable attention has been given to automatic

TABLE IV—CENSUS FOR 1920 AND RECORD OF FARE INCREASES GRANTED IN WISCONSIN CITIES

City	Population	Cash Fare	Ticket Fare	Present Fare Became Effective
Appleton	19,561	5 cents	Nothing stated	2-12-19
Ashland	11,334	7 cents	6 for 40 cents	10-16-18
Beloit	21,284	5 cents	Nothing stated	1915
Chippewa Falls	9,130	6 cents	Nothing stated	8- 1-18
Eau Claire	20,880	6 cents	Nothing stated	8- 1-18
Fond du Lac	23,427	8 cents	10 for 70 cents 50 for $3.00	9- 5-20
Wisconsin Rapids	7,234	10 cents	*	2-20-19
		5 cents	†	2-20-19
Green Bay	31,017	10 cents	5 for 35 cents	1- 1-21
Janesville	18,293	10 cents	7 for 50 cents	10-29-20
Kenosha	40,472	7 cents	8 for 50 cents	10-30-20
La Crosse	30,363	6 cents	18 for $1.00 (Workmen's tickets) 6 for 30 cents (School tickets) 25 for $1.00	9-16-18
Madison	38,378	6 cents	9 for 50 cents	11-16-18
Manitowoc	17,563	6 cents	5 for 30 cents	8- 9-18
Marinette	13,610	7 cents	10 for 50 cents	8-27-20
Merrill	8,068	7 cents	9 for 50 cents	12-23-18
Milwaukee	457,147	7 cents	8 for 50 cents	11- 2-19
Oshkosh	33,162	8 cents	5 for 35 cents 50 for $3 00	9-17-20
Sheboygan	30,955	8 cents	10 for 70 cents 50 for $3 00	9-11-20
Racine	58,593	7 cents	6 for 35 cents	12- 1-20
Superior	39,624	5 cents	Weekly tickets $1 00, unlimited riding, transferable.	

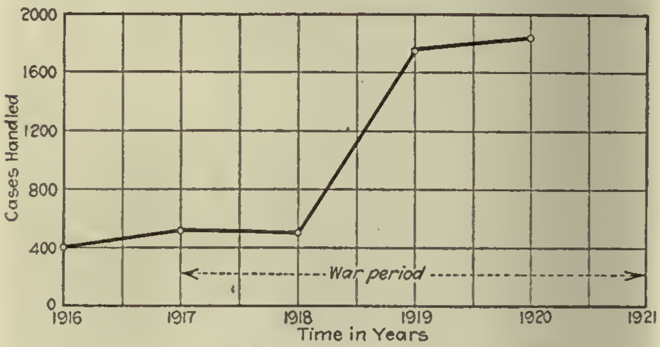
* From Wisconsin Rapids to Port Edwards.
† From Port Edwards to Nekoosa.

train control in the State, but since the prerequisite for such control is necessarily a perfect system of automatic signals, this advance field has been postponed until the signal system is nearer perfection.

Complete records of all the crossings in the State are kept and filed by means of photographs which show views, angle of crossing, height of grade and location, reference to which and suggestions for their betterment make for a minimum of accidents.

Accident reports form a necessary part of the commission's routine work, though none but the most important is investigated. Reports by the corporation involved must be in the commission's hands within two days after occurrence and, if the case warrants, facts are gathered, witnesses summoned and a report upon which much legal action depends given out by the commission.

Work in connection with the elimination of grade crossings by viaducts and subways has been encouraged in every way possible and advances in this line have been numerous.



THE WORK OF THE COMMISSION WAS GREATLY INCREASED AS A RESULT OF THE WAR

Due to the increasing use of electrical apparatus by relatively unskilled people a more comprehensive set of rules governing its installation and use was needed. As a result of this need a large committee was appointed for its compilation. The model for this new safety code will be code No. 54 of the U. S. Bureau of Standards.

IV—PHYSICAL PROPERTY VALUATION

The commission requires two valuations of any property by its engineering department—one, a true reproduction value, and the second, a ten-year average value. The former determination is for use only in case of sale of the utility property, while the latter, which is the most used, is for rate-making purposes. In the determination of these valuations the most favored plan is what is known as the split-inventory method. The total inventory of an operating utility is classified and split into its various cost periods. The items in the inventory are carefully assigned a per cent condition value in terms of their new condition and by use of a complete *"life table"* which covers all items used. This "life" or depreciation table is used in conjunction with the "rating" given to each operating utility as to its maintenance—the rating being given in per cent perfect—80-85 per cent rating is considered good for separate stations and 90 per cent for system fed from a transmission line.

TABLE V—AUTHORIZED MOTOR-BUS OPERATORS IN WISCONSIN

	Authorized Bonded Carriers
Milwaukee	42
Racine	5
Kenosha	3
Remainder of State	26
Total	

The foregoing methods of appraising property have demanded some modification in the last few years, due to rapidly fluctuating prices, but in general they are accurate and easily applied for the commission's needs.

VI—JITNEY REGULATION

Particular attention has been paid by the commission to jitney regulation in the State. Due to increased costs of operation the number of jitneys has radically decreased during the past two years. Table V shows the number of authorized bonded carriers in operation in June, 1920.

CONCLUSION

The work of the Wisconsin commission, though founded on new lines, has proved its worth and now by virtue of cases handled, decisions rendered and satisfaction given it can be consequently placed in a high rank in state regulating bodies. Its decisions are widely quoted in court opinions and by experts in utility and railroad management. Though no mention has been made of it, additional duties are performed for other state departments which include rent, water power and securities or blue-sky regulation. The work as performed by the commission has been done with one single viewpoint in mind—public relations. This one thing has been carefully fostered and, though some dissension must always be evident in such a field, the consensus of opinion would easily show the commission to be the true, unbiased body which its law intended.

State Aids Interurban Bus Lines in France

IN THE May-June, 1921, issue of *L'Industrie des Tramways*, M. Paris, general manager, Société Générale des Transports Départmentaux, an organization which has developed motor-bus cross-country services in France, describes some of the advantages of this mode of transport. The war, of course, had proved the wonderful flexibility of both passenger and motor truck. Pre-war trials with motor buses, especially in the Haute-Garonne department, had also been most satisfying.

Since post-war costs of railway building are six times greater than before the war, it was obviously impossible for private operators or the government to meet the demands for service, even from regions where there is little population. Here is where the bus comes to the rescue in any place where the roads had been good enough for animal transport. Not only is the bus valuable in handling the traffic offered today, but also in determining when railway construction would be justified. Because of the mobility of the bus, also, it is feasible to run the same vehicle along different routes on different days of the week, as in the sparsely-settled districts, and to concentrate sufficient buses on any one route which is favorable by a fair or other traffic-raising occasion. On the routes served by M. Paris' company, use is made in some cases of a fifteen-seat trailer behind the motor bus.

A number of these lightly traveled bus or stage routes in France are subsidized by the government, but not liberally enough in the view of M. Paris. The March-April issue of *L'Industrie des Tramways* lists about 150 State-aided autobus routes. A large number of these are in the mountainous districts in southeastern and southwestern France and are probably postal routes.

Bus and Car Costs Compared

The Writer Compares Estimates on Operating Costs of Motor Bus, Trolley Bus and Safety Car, as Given in Recent Articles in This Paper by Messrs. Thirlwall and Stocks, and Defends the Figures of Mr. Thirlwall

By H. L. Andrews
Railway & Traction Engineering Department, General Electric Company

THE ELECTRIC RAILWAY JOURNAL has recently published two very excellent articles covering the relative cost of operation of the rail car, the trolley bus and the gasoline bus.

In Mr. Stocks' clear analysis of this transportation field, which appeared in the Sept. 24 issue of the ELECTRIC RAILWAY JOURNAL, he arrives at the same general conclusions that have been reached by J. C. Thirlwall in his very able presentation of this subject, which appeared in the issue of Oct. 1. These general conclusions are that there is an economic limitation in density of traffic for rail-less vehicles, that the field of the motor bus is in handling small loads on fairly long headways, that the rail car is the most economical and efficient means of handling mass transportation where short headways are required and that the field of the trackless trolley lies in between these two extremes. But in the actual cost of operation of the three types of vehicles these two authors differ widely, and therefore they do not agree on the economic limitations or degree of traffic density that determine the dividing line between the economic use of the three systems. There is also a further difference of opinion on the relative number of vehicles required for a given amount of traffic.

In view of this wide diversity of opinion between these two authors, it seems desirable that some additional evidence be presented bearing on the operating costs of the three types of vehicles, their relative capacity for handling peak loads and therefore the headway, limitations and degree of traffic density that mark the dividing line between the economic use of the three systems.

Mr. Stocks has evidently used as the basis of his article operating costs of safety cars considerably higher than those used by Mr. Thirlwall. There is presented in Table I a number of actual operating costs, together with the costs assumed by Mr. Stocks and Mr. Thirlwall in their articles:

TABLE I—COSTS IN CENTS PER CAR-MILE OF SAFETY CAR OPERATION FROM VARIOUS SOURCES

	1	2	3	4	5
Maintenance of way and structures	1.46	2.0	1.6	2.0	2.1
Maintenance of equipment........	1.55	2.0	1.7	1.7	4.0
Power...........................	1.04	2.5	1.9	2.5	3.6
Conducting transportation........	6.35	6.5	8.4	9.0	9.71
General and miscellaneous........	1.92	3.5	2.4	3.0	4.06
Total....	12.33	16.5	16.0	18.2	23.47

1. Actual average costs, Mid-western property operating sixty-six cars, year 1921.
2. Cost estimate of a large holding company operating several hundred cars.
3. Actual average results in 1920 of ten companies operating 500 cars.
4. Costs assumed by J. C. Thirlwall.
5. Costa assumed by C. W. Stocks.

If actual results are conclusive evidence of operating costs, it appears that Mr. Thirlwall has been very conservative in his estimate of 18.2 cents per car-mile for the operating costs of the safety car and that Mr. Stocks has been too conservative in increasing the operating costs of the safety car by nearly 47 per cent over the actual costs obtained from ten companies which have operated 500 safety cars for three years or more.

[EDITORS' NOTE.—Mr. Stocks in a supplementary statement briefly explains the basis of his estimates.]

These authors also differ widely on the estimated operating costs of the trolley bus and the gasoline bus, this difference evidently being due to the difference in basic assumptions. While no actual operating costs for the trolley buses are available, these may be estimated with a fair degree of accuracy by basing such estimates on the actual operating costs of safety cars and gasoline motor buses. The operating costs assumed by Mr. Thirlwall and Mr. Stocks for both the trolley bus and the gasoline motor bus are given in Table II:

TABLE II—OPERATING COSTS IN CENTS PER BUS-MILE AS GIVEN IN THE ARTICLES BY MESSRS. THIRLWALL AND STOCKS

	Trolley Bus		Gasoline Bus	
	Stocks	Thirlwall	Stocks	Thirlwall
Maintenance of way and overhead......	0.888	0.7	0.1	0.0
Maintenance of equipment............	6.5	4.0	8.5	8.5
Power...............................	3.1	2.3	3.55	7.0
Conducting transportation............	9.9	9.0	9.9	9.0
General and miscellaneous............	3.9	3.0	3.9	3.0
Total..........................	24.2	19.0	25.95	27.5

Reference to this comparison indicates that there is a fairly wide difference of opinion between authors as to the costs of operation of both of these rail-less vehicles. Knowing the operating costs of the safety car, using the actual results obtained from a number of railway companies operating these cars for a reasonable period, and with fairly accurate data on the operating costs of several gasoline bus installations, we have substantial evidence on which to base the cost of operation of the trolley bus. Primarily, the difference between the estimates used by the two authors lies in maintenance and power costs.

MAINTENANCE AND POWER COSTS

The electrical equipment of the trolley bus is essentially the same as the safety car and should therefore have practically the same maintenance costs.

There are accurate data showing that the cost of maintaining the electrical equipment on safety cars is approximately 0.3 cents per car-mile. From such data as are available on segregated costs of body and chassis on gasoline bus lines, it is reasonable to assume the total maintenance of the body and chassis of the trolley bus to be not more than 1.35 cents per bus-mile, making the total maintenance for this bus complete, less tires, 1.65 cents per bus-mile. Where solid tires are used with gasoline propelled buses, records show that the tire costs vary from 1 to 2 cents per bus-mile. Assuming the higher figure for the tire costs, the total cost of maintenance of the trolley bus should be not more than 3.65 cents per bus-mile.

If we may safely base the cost of the trolley bus on known costs of the safety car and the gasoline bus, and it seems reasonable to believe that we can, it appears that Mr. Thirlwall's estimate of 4 cents per bus-mile for maintenance is conservative and that Mr. Stocks has been too conservative in estimating the maintenance costs of 6.5 cents per bus-mile.

Mr. Stocks has assumed that a safety car will require at the car 200 watt-hours per ton-mile and that the trolley bus will require 250 watt-hours per ton-mile. Corresponding figures used by Mr. Thirlwall are 150 watt-hours per ton-mile for the safety car and 195 watt-hours per ton-mile for the trolley bus. Mr. Stocks assumes 2.25 cents per kilowatt-hour as the cost of power at the car, while Mr. Thirlwall, with line and conversion losses included, assumes a cost of approximately 1.6 cents per kilowatt-hour at the car.

The power costs will of course vary widely in different localities, but from data published by the American Electric Railway Association it seems conservative to estimate the cost of generating power in a large station to be 1.1 cents per kilowatt-hour and in a small station 1.6 cents per kilowatt-hour at the alternating-current bus. Assuming 15 per cent line and 25 per cent conversion losses, these figures become 1.59 cents per kilowatt-hour and 2.3 cents per kilowatt-hour at the car. The figures used by Mr. Stocks correspond to the maximum power rate, while the figures used by Mr. Thirlwall correspond to the minimum power rate. As a general average, 2 cents per kilowatt-hour and 1.5 kilowatt-hour per car-mile will probably represent average power conditions for the trolley bus, or the total cost of power will be 3 cents per bus-mile as against 6 to 8 cents for the gasoline bus, or a saving of 3 to 5 cents per bus-mile in power.

The operating costs of a gasoline bus can best be determined from actual installations. While the authors differ materially in the cost of operating gasoline-propelled machines, it is apparent that Mr. Stocks has based his operating costs on one of the most widely known and best operated gasoline bus installations in this country, while Mr. Thirlwall has taken the average operating costs for five representative installations of the motor bus. It is difficult to find motor bus installations where the fuel economy assumed by Mr. Stocks is actually obtained. Most of the data available on fuel consumption are based on buses weighing from 7,000 to 8,000 lb. If this should be adjusted to a 10,000 or 11,000 lb. vehicle, it is doubtful if the estimates of 7 miles per gallon used by Mr. Stocks can be equaled.

If the fuel consumption of the gasoline bus is based on average conditions and average installations, it is conservative to assume 4 to 4½ miles per gallon of gasoline, which at a wholesale price of 22 cents corresponds to 5 to 5½ cents for power. The cost of lubrication increases this from 1 to 1½ cents per bus-mile, making a total charge for power and lubrication of from 6 to 8 cents per bus-mile.

Here, again, if we take actual results from several typical installations of the gasoline bus and base the operating costs of this vehicle on these known results, it appears that the figures used by Mr. Thirlwall are more nearly representative of actual practice and that those used by Mr. Stocks are anticipated economies in fuel consumption which have not yet been realized.

CAPACITIES AND SCHEDULE SPEEDS

It would appear from Mr. Stocks' article that he has lost sight of the fact that a safety car has a greater carrying capacity than either type of bus and that to provide carrying capacity for a given number of people more buses than safety cars would be required. Fundamentally, the vast majority of rail cars have been designed with particular reference to rush-hour conditions. Their dimensions both in floor area and in cubical contents are governed by the idea of providing seating capacity considerably in excess of the normal mid-day or evening load and of handling during rush hours a standing load at least as large as the seated load. Motor buses on the contrary, with few exceptions, have been designed with the one thought of providing seating space for the light-hour loads, and no attempt has been made in their development to furnish the additional seats or space for the tremendous percentage of increase over normal riding that occurs during the rush hour. The safety car was developed as a compromise between these two viewpoints, in that the seating capacity was brought nearer to the normal load than in the majority of rail cars, but it was nevertheless laid out and constructed to carry comfortably peak loads of nearly double its seating capacity. So far as records indicate, no buses have been designed to accommodate any such proportion of rush-hour excess capacity.

Some typical designs of recent buses have dimensions as given in Table III.

TABLE III—COMPARISONS OF DIMENSIONS OF RECENT BUSES WITH SAFFTY CAR

	Brill	Imperial	Average Bus	Safety Car
Seating capacity	29	29	..	32
Length	20 ft.	20 ft. 6 in.	..	28 ft.
Width	7 ft. 4 in.	7 ft. 0 in.	..	7 ft. 10 in.
Floor area, aquare feet	147	144	..	218
Maximum capacity, assuming 3.6 sq.ft. per passenger	41	40	40	60

With this as a fundamental, any comparison of buses, either gasoline or electric, with safety cars should be made on the total carrying capacity of each type of vehicle. In other words, to provide the same carrying capacity during rush-hour service there must be 50 per cent more buses in service than safety cars. This has been recognized by operators of rail lines which are using gasoline buses as auxiliaries. Mention was made of this by R. Gillman Smith in a paper entitled "The Motor Bus as a Supplement to Electric Railways," read before the 1920 convention at Atlantic City and published in the ELECTRIC RAILWAY JOURNAL of Oct. 16, 1920. Mr. Smith has assumed that the safety car can carry sixty passengers, or approximately double its seating capacity, while the gasoline bus has an overload capacity of but 67 per cent. It is Mr. Smith's conclusion that with bus transportation the number of units operated during rush hours would be increased 120 to 140 per cent over the base schedules, as compared with an increase of 100 per cent in the number of rail units. Mr. Stocks has lost sight of this, and in making his comparison between rail cars and the buses he has assumed that the same number of vehicles would be operated in each case.

The schedule speeds for the three types of vehicles as given by Mr. Stocks—that is, motor bus 10 m.p.h., trolley bus 9 m.p.h., and rail car 8.57 m.p.h.—take into consideration only the greater mobility of the bus and do not consider the greatly superior accelerating qualities of the trolley bus over the gasoline motor bus. In so far as mobility is a factor of schedule speed, the trolley bus has no handicap over its gasoline competitor. Collecting devices have been developed which permit a wide range of operation, and this vehicle has the ability to maneuver in traffic the same as the gasoline motor bus. Due to the higher rate of acceleration obtainable with the trolley bus, it can hold higher schedule speeds than the gasoline propelled machine.

Mr. Stocks and Mr. Thirlwall differ in the several factors entering into the fixed charges, particularly in the rate of interest and in the rate of depreciation. The values assumed by each of these authors follows:

TABLE IV—COMPARISONS IN CENTS PER VEHICLE-MILE IN DEPRECIATION AND FIXED CHARGES

	Thirlwall			Stocks		
	Gas Bus	Trolley Bus	Safety Car	Gas Bus	Trolley Bus	Safety Car
Interest paid	9.0	9.0	9.0	7.0	7.0	7.0
Taxes	2.8	2.8	2.8	2.0	2.0	2.0
Depreciation	6.9	3.7	3.2	11.2	10.78	5.6
Total	18.7	15.5	15.0	20.2	19.78	14.6

The principal difference is in the life of the vehicle. Mr. Stocks assumes the life of the safety car as twelve years, a motor bus and trolley bus as eight years, and has depreciated these vehicles over a straight line, while Mr. Thirlwall assumes fifteen years for the safety car and the trolley bus, and that the life of the gas equipment on the motor bus will be no more than five years. He has carried his depreciation as a sinking fund.

It is difficult to recognize the basis assumed by Mr. Stocks in giving the gasoline-propelled machine a life of eight years. All of the gasoline bus operators depreciated their equipment at the rate of 20 to 25 per cent, and it is the universal recommendation of the majority of gas bus manufacturers that the gas equipment should be depreciated over not more than a five-year period. It appears that Mr. Stocks has been too optimistic on the useful life of gasoline equipment and perhaps too conservative on the life of the safety car and the trolley bus.

Mr. Stocks has included a charge of $466.66 per mile of route for rail lines to cover the cost of removal of snow and ice, cleaning and sanding track, etc.

Certainly if this is a proper charge against a rail line, it is an equally proper one against the bus routes, and in making comparisons it is reasonable to assume that the rail-less vehicles, either gasoline or electric, will be burdened with an equal, if not greater, operating charge to cover this item.

A careful study of both Mr. Stocks' and Mr. Thirlwall's articles indicates that Mr. Stocks' article is predicated on incorrect operating costs for all three vehicles and that his assumptions as to the relative numbers required are incorrect. As a result, his conclusions must be modified. The rail car has a much wider field of economic superiority than he assumes and must still be considered the most efficient means of handling all routes of heavy and of medium traffic. The motor bus, on the contrary, has a less extensive range of possibilities than his figures would indicate, and under practically all conditions of city service where any type of rubber tired car would be desirable the trolley bus is more efficient and less expensive than its gasoline cousin.

Why the Figures Differ

By C. W. Stocks

IT IS NOT surprising that a comparison of the two statistical analyses dealing with the cost of service rendered by the motor bus, trolley bus or safety car should disclose some differences of honest opinion. This is especially true with analyses predicated for the most part on estimates on the part of two persons, even when based so far as possible on actual results. Another reason why the comparisons differ is that the bases of the two analyses are entirely different. The analysis by J. C. Thirlwall is based on a 4.5-mile route having a rush-hour period, whereas the analysis of the writer was for a 3-mile extension to an existing class A urban transportation system on which rush-hour traffic would be of little or no consequence.

A comparison of the individual assumptions discloses that in figuring investment costs there is a considerable difference in track and distribution system unit costs per mile as well as in the cost units set up on a vehicle basis for storage and shop facilities. In one case a power plant and automatic substation is figured as part of the investment as against purchasing power at proper voltage. Mr. Thirlwall has not considered any additional investment for land, shop tools and machinery for either form of service.

Taking up the assumptions that go to make up the items used in calculating the cost of service, it is immediately obvious that Mr. Thirlwall has used a constant car-mile unit figure throughout for the service items that enter into each cost analysis. Transportation unit costs as a rule vary inversely as the car-miles run, although there are some costs that vary directly with the mileage and others are independent of the amount of service rendered.

It is for that reason that both track maintenance and electric line expense each were divided into fixed and variable parts and the allowance for building maintenance was taken equal to the depreciation allowance.

In Table I on page 769, in which comparative safety car operating costs are presented, the differences that are claimed to exist in maintenance of equipment of expense are due to the inclusion of allowances for superintendence at 1.6 cents per car-mile, shop expenses at 0.3 cents per car-mile and maintenance of service equipment and shop equipment at $200 per year, in addition to 2 cents per car-mile for maintenance of car body and electrical equipment.

The cost of power varies to such an extent, depending on whether it is purchased from water power or steam plants, that any attempt to say that such costs are less than the commonly used average maximum would lead to an erroneous result. One reason that the allowance for conducting transportation is so high is that platform costs were predicated on a wage scale of 65 cents per man-hour, with an average schedule of 8 4/7 miles per hour, as against a tight schedule of 9 miles per hour and wages at 50 cents per hour as assumed by Mr. Thirlwall. The figures shown in column 5 of Table I on page 769 cannot be taken as true average figures as they represent merely the average of the average car-mile figures and are not weighted in accordance with the number of car-miles run under each headway.

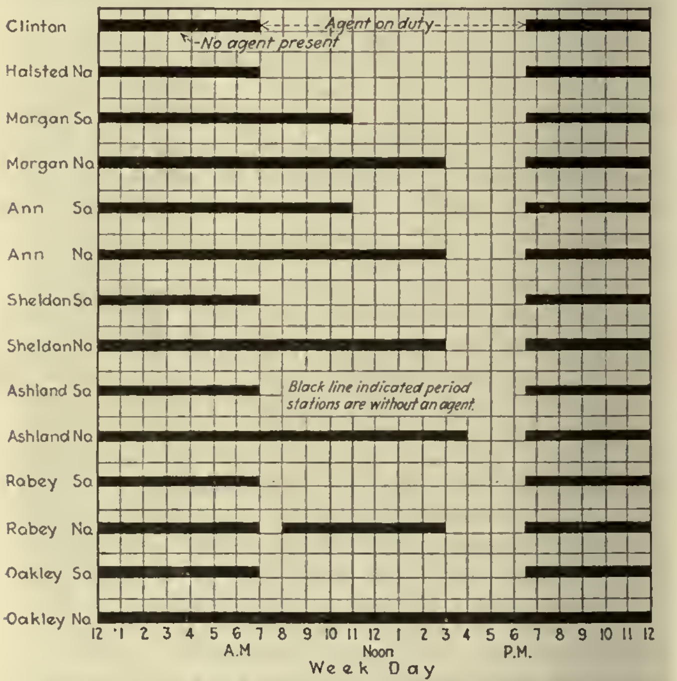
For the reasons explained in connection with Table I, maintenance of equipment for the trolley bus and motor bus in Table II are figured to cover not only the vehicle maintenance but their proportionate share of superintendence and other shop expenses. The cost of power consumed by the trolley bus is based on purchased power at 2¼ cents per kilowatt-hour at the car, which is estimated to be 250 watt-hours per ton-mile on an 11,500 lb. vehicle. This unit includes power for heating and lighting the trolley bus as well.

The difference in power costs for the motor bus; that is, for gasoline and oil, lies entirely in the assumptions. Mr. Thirlwall's investment costs seem to be based on a modern bus, but his operating costs on an entirely different type of equipment. Present-day vehicles built especially for passenger service with an engine of higher speed than the sluggish heavy duty truck motor will give better operating results than he has calculated.

As for the life of the motor bus versus the trolley bus, body manufacturers are attempting to build bodies with a ten-year life, and it is easy to believe that the chassis frame will last as long. In the case of an engine, it is right to expect that as it wears out it can be replaced by a new one—like the transmission or rear end. The composite life of all the equipment is then dependent on the life of the body and frame and not on that of a removable part any more than is the case with a safety car.

Chicago "L" Eliminates Some of Its Station Agents

WITH diminishing business as a spur to greater economy, M. J. Feron, general superintendent of transportation Chicago Elevated Railways, has devised a scheme for use on the Chicago & Oak Park Elevated Railroad which has made it possible to dispense with the services of fifty-two station agents. The Oak Park elevated is so constructed that a separate agent is required for each direction of travel at each station. A study has developed that at twenty-five of these locations the traffic is so light that the station agent can be done away with without introducing any difficulties in fare collection. During a large part of the day at these stations there are only three or four passengers per train per station to board. So it has been arranged that during the hours when there is no station agent present, the fares will be collected on the train by the conductor. The trains in these light periods are usually only three cars long, so that with the average of only three or four passengers per station to collect from, and only three cars to cover, the conductor who is stationed on the first car can easily handle this additional work. Should conditions require more than three cars, arrangements have been made for one of the guards to assist the conductor in collecting the fares, turning over his collections to the conductor.



WEEK-DAY SCHEDULE OF STATION AGENTS FROM CLINTON TO OAKLEY ON OAK PARK ELEVATED RAILROAD

The accompanying chart shows the names of the stations from Clinton to Oakley which will be without an agent during part or all of the day, and the hours during which each station will have an agent or will be agentless. The period during which an agent is present varies with the local conditions. This accounts for the variations in the schedule of hours for the station agents. The schedule was so worked out that the agents continued in the employ of the company are able to get in eight hours duty each day. A saving of $260 per day has been effected through this scheme.

Copies of these schedules for week days, Saturday and Sunday are posted in the trainmen's room, but the conductors are further informed by a large sign as to whether they should collect fares from persons boarding at any station. This sign is placed on the platform in plain view of the conductor when no agent is there.

The stations closed during part of the time are those between the Loop and Hamlin Avenue. The stations beyond Hamlin Avenue handle a sufficient number of people, so that it was not deemed advisable to leave them agentless during any period of the day, at least for the present. Hamlin Avenue is about 4 miles west of State Street.

Trolley Buses at York, England

THE route over which the York trolley buses are operated is about 1¼ miles in length from the Market Square of the city to Heyworth. Several very narrow streets have to be traversed and the turnings are numerous and sharp, the route being indeed an impracticable one for tramcars. The trolley buses, four in number, which have been operated nine or ten months, are of the single-deck type with seats for twenty-four passengers. There are five seats at the back and two rows of longitudinal seats. The left side seats ten, and the right but nine. They are light vehicles and are extremely narrow, the over-all width being but 6 ft. 3 in. The entrance is close to the driver's seat, so that they can be operated by one man, who also supervises the payment of fares as the passengers enter. Each trolley bus has two 23-b.hp., motors which are set amidships with their armature shafts parallel to the frames. Each motor drives one of the rear wheels by means of worm gearing. There is no other gearing on the chassis and a differential is, of course, unnecessary. Rollers and ball bearings are employed throughout and the weight of the vehicle rests entirely on the axle casing, the axles having only to transmit the torque, which is taken by the springs. The motors are controlled by a railway series parallel controller. Service brakes act on the rear wheels and an emergency brake on the motor shaft.

The overhead equipment is exactly similar to that of a trolley line except that the wire is duplicate to afford a return circuit. The trolley wires are 21 ft. from the ground and the 17-ft. steel trolley poles on the bus permit the vehicles to travel at a distance of 15 ft. on either side of the center of the wires. The trolley wheels are deeply grooved and ample freedom of swiveling is arranged for. It is stated that, exclusive of capital charges, the cost of running was 11.5d. per car-mile. The total cost of service, including fixed charges, taxes, etc., amounts to 1s. 6d. per car-mile. Current was supplied at 2d. per kilowatt-hour and the consumption was 1.42 kw.-hr. per car-mile measured at the station, according to an article in London *Engineering* of Sept. 2, 1921.

Transportation by Motor Bus in Gloucester

Organized Bus Company Supplants Independent Jitney Bus Operation that Sprang Up Overnight When Rail Service Was Withdrawn—Conditions Under Which Buses Operate Given in Detail—Rates Call for 10-Cent Minimum, with More for Longer Rides

GLOUCESTER, the outpost of the Commonwealth of Massachusetts and one of the historic spots of New England, holds also the record of being the first city in the country with a population of more than 20,000 to depend solely upon the motor bus for urban and suburban transportation. Not since June 19, 1919, has there been any other means of transportation. On this day the ultimatum previously delivered by the board of trustees of the Eastern Massachusetts Street Railway called for a cessation of service unless the taxpayers of the city would meet the operating deficit, which had been estimated at $20,000 or more per year. The City Council, on behalf of the people, declined to make any such guarantee unless it was approved by the people on a referendum.

This meant that not only were the cars in the city of Gloucester taken off but those on the suburban lines to Rockport, Essex, Hamilton and Beverly as well. In all service was discontinued on approximately 30 miles of track. Gloucester, so far as trolley car service was concerned, was isolated and the only means of reaching the city from outside points was by the steam railroad or by a motor bus line from Beverly via Manchester-by-the-Sea.

Immediately upon cessation of the trolley service independent jitneys flocked to the city from neighboring points and attempted to handle the traffic. For more than six months this was the only means of transportation that existed. There could be but one answer, namely, the unregulated and unorganized jitney, without fixed and co-ordinated schedules, and with each owner operator trying to cut everybody else's throat, so to speak, failed from a transportation standpoint to render efficient service to the community as a whole.

OPERATING CONDITIONS FOR BUSES

Realizing this, the City Council undertook to bring some system out of the chaos that existed and approached the traffic problem from a regulatory standpoint, drafted an ordinance and put the motor bus transportation directly under the control of the Mayor, with the hope of encouraging an operating company to be formed to take over the entire system of bus operation.

The ordinance as passed provided for the licensing of all motor vehicles operated on the public streets for the transportation of passengers for hire and became effective Feb. 6, 1921. This ordinance made it necessary for each motor vehicle to carry a license, obtained from the Municipal Council and subject to the approval of the Mayor, which must be renewed annually. Such licenses as granted and approved by the Mayor, however, did not become operative until a security amounting to $12,500 by bond or otherwise had been deposited with the city treasurer for each motor vehicle having a seating capacity of twenty-five and an additional sum of $500 for each additional seat. The filing of an approved insurance policy by any one licensee to the extent of at least $20,000 total liability for injury or death in any one accident or for $5,000 for injury or death of one person and $1,000 for property damage directly caused by each vehicle allowed this security to be reduced to $500 in the form of a bond for each motor vehicle. These bonds are purely liability bonds.

Another requirement of the ordinance provided that metal plates bearing the words, "Licensed Motor Vehicle, No. — , Gloucester, 1921, —— passengers," setting forth the serial number of the license, the date and number of passengers exclusive of the operator that the bus can carry, are issued by the city and must be displayed on the inside dash of the motor vehicle. Destination signs are required.

The bus operators are also required to file with the city all operating schedules and tariffs and only the fares shown in the tariffs may be charged unless seven days notice is given to the city clerk and approval of the new rates is granted by the City Council. In case the increase is denied by the Council the bus company must continue operation under penalty as described herewith.

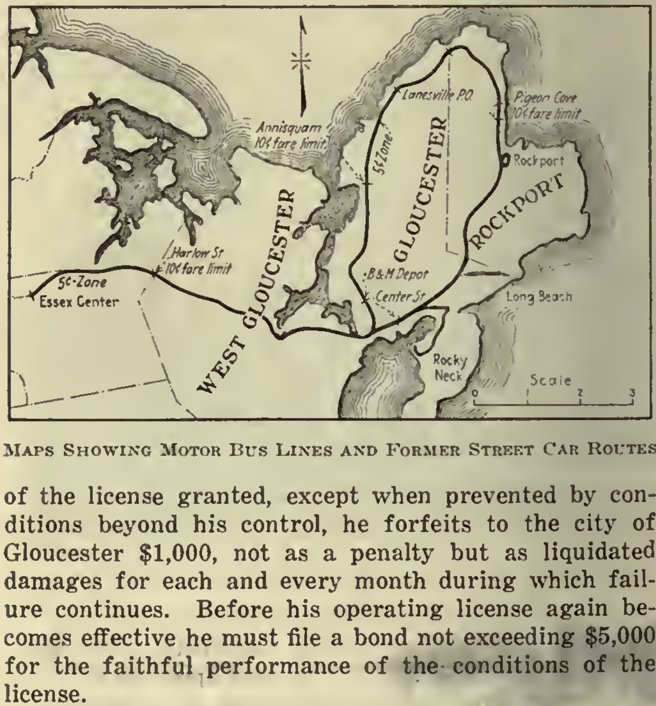
Each individual motor bus operator must hold a driver's license granted by the city. Applicants upon

FRONT OF GARAGE WHERE BUSES ARE REPAIRED AND PUT UNDER COVER WHEN NOT IN SERVICE

passing the requirements are given a badge which must be openly displayed when they are operating their buses. Such badge licenses are not transferable. The city clerk issues an identification card to successful applicants, which must be carried by the operator at all times when on duty. Such license fees cost $1 per year.

Motor bus drivers by the ordinance are prohibited from smoking while driving, from collecting fares, making change, etc., or discharging passengers while the vehicle is in operation. They are not allowed to pass up prospective passengers unless the bus they are driving is carrying its full licensed load. Other regulations provide for operators turning in all articles left in their vehicles, for stopping prior to crossing railroad tracks, for adequate interior illumination at night, for maintaining heat in winter and for reporting injuries to passengers or damage to property in which they are involved.

License fees payable to the city of Gloucester for the use of the streets are $10 per year per bus licensed. This is the only payment to the city for the use of the streets. In addition the company pays the usual property tax and state vehicle license tax. In the event that the motor bus licensee fails to comply with the terms of the license granted, except when prevented by conditions beyond his control, he forfeits to the city of Gloucester $1,000, not as a penalty but as liquidated damages for each and every month during which failure continues. Before his operating license again becomes effective he must file a bond not exceeding $5,000 for the faithful performance of the conditions of the license.



MAPS SHOWING MOTOR BUS LINES AND FORMER STREET CAR ROUTES

Licenses for the operation of vehicles as well as the individual driver's licenses can be revoked or suspended by the Municipal Council after a hearing for violation of any law of the Commonwealth relating to the operation of motor vehicles or municipal traffic ordinances, provided such violation has continued for a period of five days after proper notice to the licensee.

At least sixty days prior to the termination of licenses for the right to operate vehicles the licensee must either file petition for a renewal of his license or notify the Municipal Council of his intention to discontinue the operation of motor vehicles when his license expires.

Under the terms of the ordinance pupils' tickets must be sold in lots of ten or forty at one-half the regular cash fare. This is in accordance with the Masssachusetts street railroad laws.

As a precaution against accidents due to skidding when highways are so slippery as to be dangerous all vehicles must use proper non-skid tire chains. Vehicles are also required to carry an extra tire if equipped with pneumatics.

In December, 1920, the Gloucester Auto Bus Company was organized under the Massachusetts laws with a capital of $150,000, divided into 15,000 shares of $10 each. The company has a paid in capital of about $75,000. Some 6,500 shares represent the garage valued at $20,000 and part payment of the buses at $45,000. The fleet of 16 motor buses represents an approximate value of $125,000.

ROUTES OPERATED

It was not until May 1, 1921, that the Gloucester Auto Bus Company actually took over the entire transportation of passengers to Rocky Neck, Annisquam and Lanesville, as well as to West Gloucester and Essex. On Aug. 1, 1921, motor bus service was extended to Long Beach, Rockport and Pigeon Cove. Two trips per day were also inaugurated between Rockport and Lanesville via the Cape Road, about the same time. The five bus routes which are shown on the accompanying map follow the streets for the most part formerly used by the trolley cars, the only exception being the line to Long Beach, which travels an entirely different route due to the fact that the railway company reached that point via a trestle over the marshes.

The city of Gloucester, in improving the roads for bus operation, has in some cases, especially along Main Street, covered up most of the trolley tracks with bituminous macadam. In Rockport there are places where concrete roads have been built directly on top of the former car tracks.

The base schedule maintained calls for a thirty-minute headway on the East Gloucester-Lanesville line and hourly headways on the other routes. During the morning and evening rush hours short trips are inserted so as to double the service for the greater part of the routes. The maximum number of buses in operation at one time is thirteen or fourteen. Regular drivers are paid $25 per week and spare men 50 cents per hour. Four men who drive rush-hour trips only also wash and clean their own buses.

Table I gives some statistics as to the length of the lines and the service maintained.

TABLE I

Route	Length One Way, Miles	Service Inaugurated, 1921	Trips per Day Each Way	Normal Headway	Rush-Hour on Headway	One-Way Fares, Cents
Rocky Neck-Lanesville	8.01	May 1	32	60	30	(d) 15
Rocky Neck-Annisquam (a)	6.08	May 1	12	..	30	10
West Gloucester (Harlow Street)	5.56	May 1	25	60	30	10
W. Gloucester and Essex center (b)	7.82	May 1	4	60	60	(d) 15
Gloucester-Rockport-Pigeon Cove	7.02	Aug. 1	25	60	30	(d) 15
Long Beach (c)	2.25	Aug. 1	25	60	60	10
Rockport-Lanesville via Cape Road	4 0	Aug. 1	2	..	..	10

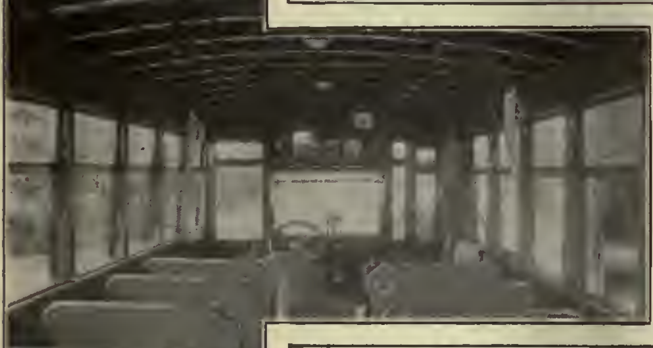
(a) Short line service, rush hours only.
(b) Rush hours only.
(c) Summer beach resort. The weather governs the headway.
(d) Minimum fare 10 cents, with additional 5-cent zone.

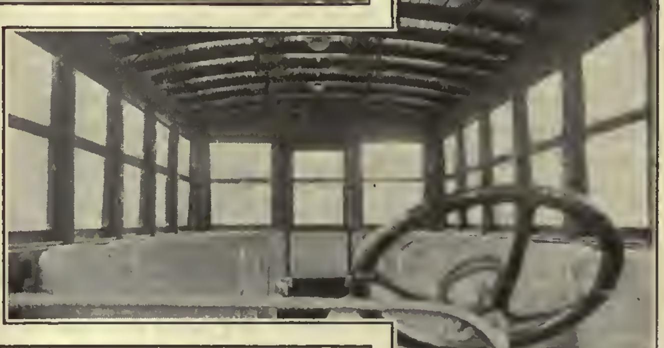
RATES OF FARE CHARGED

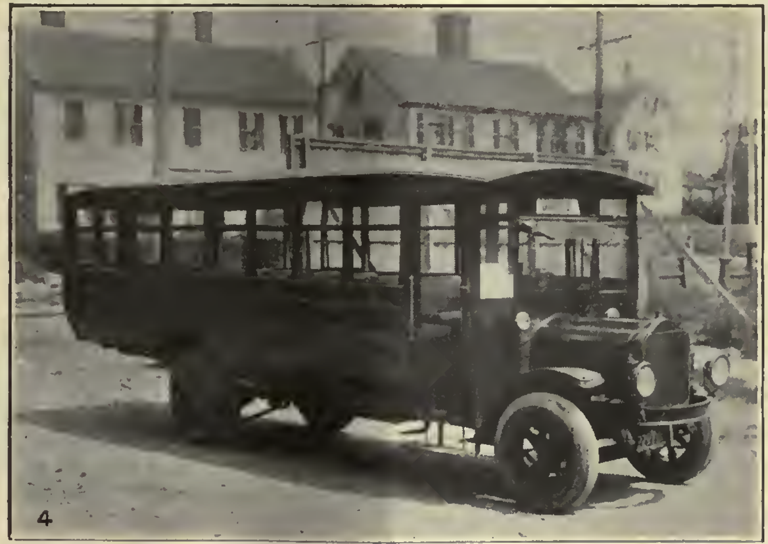
Fares are based on a modified zone system for each route with the minimum fare fixed at 10 cents without transfers between the various lines. School tickets are sold in lots of ten or forty in compliance with the Massachusetts statutes as provided in the bus ordinance.

The minimum fare points from the center of the city for each route are marked on the accompanying map. In reality it is possible to ride further on the motor buses than it was on the street cars for the same fare. This is especially true of the lines to West Gloucester and to Rockport, where the present 10-cent fare limit is a considerable distance beyond the fare point established by the trolley zone system.

Johnson fare boxes are used exclusively for fare collection purposes. The system in vogue is very simple. Passengers deposit their fare directly in the box irrespective of whether 10 cents or 15 cents. On trips outbound from the center of Gloucester fares are deposited by the passengers as they leave the bus. On inbound trips the whole fare is deposited as the passenger boards the bus. The only record kept by the bus driver is the fare box reading when he takes and leaves the bus, for purposes of settlement. No record is kept of passengers carried or of collections by trips or of the number of trips run. In fact, not even a mileage record of bus operation is kept by the company from which to compute unit costs.







No. 1. Loading at mid town terminal on Main Street, Gloucester.

No. 2. Looking forward in Type A bus body, showing fare box in relation to driver's seat.

No. 3. Interior of Type A bus body, showing seating arrangement.

No. 4. A 3½-ton White Model 40 chassis with body seating thirty-seven. Some bus, even though it is numbered 13.

EQUIPMENT

The company has available for service, under a trust certificate or partial-payment plan, sixteen White chassis of three different carrying capacities. Thirteen are Model-20 chassis and three Model 40 chassis. The frames in each case have been lengthened about 18 in. and brackets have been riveted to the side frames to give the body a wider bearing surface on the frame.

Wooden bodies are used, built by the Essex Truck Body Company, Lynn, Mass. They have drop sash windows and folding service door and a rear emergency door. The bodies on the Model 20 chassis are 17 ft. 10 in. long and 7 ft. 6 in. wide; they weigh, exclusive of the seats, approximately 1,750 lb., which is equivalent to 65 lb. per seat. The two types of bodies on the Model 40 chassis are 30 in. and 50 in. longer but of the same width and weigh proportionately more than the smaller type A. The cost of the bodies on a seat basis is about $55 per seat.

Table II on page 776 gives in detail some of the principal dimensions. The general appearance of the buses is shown in the accompanying illustrations. The upper illustration shows one of the Type A buses. The bus illustrated on page 773 is the 3½-ton truck chassis (Model 40) with a chain drive and is called Type C. The interior view shows the seating arrangement in Type A. The only difference from this in the larger type is a longitudinal seat at the left of the driver, extending up to the front dash. Heywood-Wakefield seats with rattan covering are used throughout.

The buses are equipped with giant pneumatic tires. All rear tires are 44 x 10. The front tires on Type A buses are 36 x 6, while Types B and C use 38 x 7.

In the winter months when it becomes necessary to use tire chains it is planned to put 40 x 8 pneumatic tires on the rear wheels. Several makes of tires have been tried. One bus was even equipped with Overman cushion tires, but due to the rough roads that are encountered the riding qualities were not found to be as good as with the pneumatics. At present Firestone tires are used exclusively.

The cost of the Type A bus complete and ready to run is about $7,000. Type B bus costs about $1,000 more. This cost, if figured on a seat basis, is equivalent to approximately $250.

GARAGE AND SHOPS

The company owns a spacious garage within two or three minutes run from the center of the city. It is of cement block construction, one story high with tar roof and contains approximately 20,000 sq.ft. of surface. The repair shop and offices of the company are located in this building. The shop occupies the left corner and the office the right front.

While the company does not keep a detailed record of trips nor of bus-miles run, nor of the traffic handled, it does keep a record of all earnings and expenses. Such figures, however, from a transportation standpoint are almost valueless as they have not been reduced to unit for comparative purposes.

All materials are purchased locally through one of the large local garages, the officers of which have an interest in the auto bus company.

VIEWS ON THE SITUATION

The Mayor, Percy W. Wheeler, who has always been a strong bus advocate, says in relation to the bus operation: "The Gloucester Auto Bus Company has given very good transportation. We have had one of the most successful summer seasons in Gloucester's history. Early in the season the Council gave me, as Mayor, full power to compel the Gloucester Auto Bus Company to live up to its contract with the city. We are getting a great deal more rapid transportation than under the street railway. We have not received a single complaint from any patron of the road as to injury of person or wearing apparel or of any discourteous treatment by any bus operator.

"We have had some four or five extremely heavy rainstorms which caused the worst washouts in our streets we ever have had. Amid all these thunder showers and storms the buses never missed a trip. The street railway would certainly have been delayed a number of hours under like conditions. As far as I know there is not a single suit against the bus company for injury of property. As far as the transportation having been kept up, it has been continually improved. I think it is the opinion of a great majority of the citizens that the bus transportation is very much better than the one-man car transportation given us by the street railway company.

"The factory employees and all laboring people, I think, are more than satisfied with this form of transportation as in many cases it has given them an opportunity of going to their homes for dinner and returning to work as there is at least 30 per cent saving in running time. The buses are kept very clean and are entirely free from the dust condition which we had with the street cars. On the whole, I believe Gloucester today has the best transportation system of any city in the State."

TABLE II—PRINCIPAL DIMENSIONS OF GLOUCESTER BUSES

	Type A	Type B	Type C
White chassis—model	20	40	40
Method of drive	Worm	Internal gear	Chain
Number of each type	13	2	1
Seating capacity	27	35	38
Body dimensions (inches)			
Length over all	276	300	331
Width over all	90	90	90
Headroom	73	74	73
Width inside of seats	82	82	82
Length inside	209	240	267
Height of floor	33¼	39½	40¼
Height of first step	16	19	18¾
Height of risers	7½–9¾	9½–11	10–12
Service door—clearway	22	22	22
Side post—centers	30	30	30
Width of aisle	16	16	16
Seat—centers	26½	26½	26½
Chassis dimensions (inches)			
Wheel base	169	178	188
Body overhang from rear axle	85	90	103
Body overhang from end of frame	57	41	48
Tread of wheels	61	66	66

A business man and manufacturer that is a large employer of labor was asked to comment on the bus transportation system. He says: "At present we are operated exclusively on a bus transportation from which there is very little complaint on the part of the public. Some people are willing to put up with many inconveniences in order that they may be transported home as quickly as possible, and there is no question but that the bus does give more rapid transportation than the car system, but I think we must not lose sight of the fact that there are many disadvantages. The bus proposition has not arrived at such a state of excellence that we can entirely depend upon it.

"The situation in Gloucester was somewhat different, I believe, than in other places, and the public voted for the bus in preference to the electric car, due to the fact that it is the general impression that the trustees of the Bay State Street Railway did not exactly play fair with the people of Gloucester. They offered transportation at cost which would necessitate a public fare the same or greater than the present bus fare, and in addition the city was obliged to guarantee the difference between the revenue derived from the fare and the actual cost of operation, which was a rather considerable sum. It was the question of the citizens of Gloucester and the trustees of the railway not getting together and neither being willing to give way, each thinking that the other would sooner or later change their mind. Personally I am in favor of the street cars, but only under certain conditions. I do not believe we should have street cars with the present bus fares and then be asked to contribute so heavily to the operation of the road. There are many items of depreciation and overhead that I do not believe should be borne by this system alone and figured in each part of the cost of operation. There seems to be little likelihood of the trustees opening the line unless the citizens of Gloucester will accept their proposition, and the majority of the citizens of Gloucester apparently have made up their minds that they will continue the buses unless the trustees of the Bay State Street Railway will recede from their former decisions and provide a satisfactory service at economical charge, including fares and also a fair burden of the overcharge.

"I do not look upon the bus proposition in such glowing terms as outlined by our Mayor, but I will say that I hear very little criticism of the present bus transportation; in fact, I think even far less than we heard the last few years of the car transportation furnished by the Bay State Street Railway."

On the other hand, there are street railway advocates and some of these claim that if two groups were made of Gloucester and the opinions of the people stated, there is no doubt that there would be a pronounced sentiment in favor of the street railways. Up and down Main Street are merchants who have requested that the cars be put back and their explanation of their unwillingness to come out openly as an organized unit is that they do not wish to become embroiled in a political controversy.

The claim is also made that not all the local politicians are of the same opinion as the Mayor. Alderman Silva does not believe the buses have the same merits as the street cars. At a hearing before the Massachusetts Department of Public Utilities, as late as Sept. 22, he stated that while the buses in Gloucester are new the service was at its best, but he questioned, as the buses wore out, whether the same standard would be maintained.

It is also understood that the Chamber of Commerce has taken a letter referendum from approximately 600 of its members asking that they state what they preferred to discuss in open forum. This forum was held in accordance with the wishes of the members and there seemed to be no dispute on the point that the advocates of the street railway greatly outnumbered the advocates of the buses.

Some of the hotel people who cater to the summer visitors, and there are a number of spacious hotels along the former rail routes, have complained to the railway company that the loss of business for 1921 was large. These hotel operators have asked the railway to restore the car service before next spring.

Analysis of Bus Operation

One New England Company Finds Supplementary Bus Service Is Not of Itself Profitable—Bus Operation on Seat-Mile Basis Exceeds that of Rail Service

THE Connecticut Valley Street Railway, which has been operating a motor bus route between Greenfield and Turners Falls, Mass., since Nov. 4, 1919, has from its experience reached a conclusion that is of interest to other railway-bus operators. In a recent letter the company says:

"Our conclusions up to date on this type of transportation, which have been reached after a comparatively short time, and by no means through the results of a large operation, are that as a means of supplementing existing street railway service there is a small possibility of making both ends meet in the operation of the buses. The territory which otherwise would not be served by transportation facilities on account of the cost of creating it can be served at a much less original investment by bus operations. Its ability, however, to take care of large loads is not as flexible as that of the street railway and the comparative cost of operation, even under present high costs, is still in favor of the street cars, if the costs are measured by the expense of providing seats per mile.

"It may be said, however, in justice to the service which we inaugurated, that we succeeded in driving out the unregulated competition which was seriously affecting our revenue, and we have also been able, by having both facilities within our control, to curtail substantially our street car service, as both the bus route and street car route reach the same termini, but by different routes."

An article in relation to the motor bus line operated by this company was given in the ELECTRIC RAILWAY JOURNAL, April 24, 1920, page 853. Since the publication of this article the company has discontinued the operation of buses over that portion of the route in Greenfield covered by Chapman, Pierce, Federal and Sanderson streets. This discontinuance was due to the lack of passengers over this part of the route.

Since that time the bus schedule has been cut in half and co-ordinated with the trolley schedule to provide a thirty-minute headway between Greenfield and Turner's Falls. The bus leaves on the hour from Greenfield and the trolley thirty minutes later. The running time for the bus is less than fifteen minutes, as against twenty minutes on the trolley. This gives an average running speed of 12.5 and 9.6 m.p.h. for the bus and trolley, respectively.

INCOME STATEMENT MOTOR-BUS OPERATION, YEAR ENDED DEC. 31, 1920, CONNECTICUT VALLEY STREET RAILWAY

	Actual	Per Bus-Mile, Cents
Passenger revenue	$20,263.31	28.23
Operating expenses:		
Maintenance of equipment		
Inspection	$1,781.24	2.48
Repairs to body and chassis	4,259.99	5.91
Tire costs	2,146.39	2.98
Depreciation of equipment	6,004.00	8.36
Total	$14,191.62	19.73
Transportation labor	4,848.85	6.75
Cost of power		
Gasoline	3,749.75	5.23
Oil	159.04	.22
Total	$3,908.79	5.45
General and miscellaneous:		
Insurance	$1,407.11	1.95
Miscellaneous credits	149.78	.21
Total operating expenses	24,206.59	33.67
Net operating revenue	3,943.28	5.44
Taxes	300 00	.41
Interest on $16,500 at 5½ per cent	900.00	1.22
Net income	5,143.28	7.07
Total cost of service	25,406.59	35.38
Bus-miles operated	71,779	......
Bus-hours operated	9,698	......
Average scheduled speed (m.p.h.)	7.42	......

The operation of this co-ordinated schedule shows that the thirty-minute bus headway provided an excess of service over the passenger requirements.

The bus fares at present are those that have been in effect since March 15, 1920, and divide the line into three 5-cent fare zones. The 10-cent minimum fare allows a ride of two full zones or less. No transfers are issued to or accepted from the trolley cars. Workmen's tickets are sold in lots of twenty-five for $3 and are good only during certain hours of the day.

The buses provide seats for nineteen passengers only. Standees are not allowed. The automotive equipment consists of three 1919 Cadillac model 57-B chassis. Since being put into service each vehicle has averaged about 40,000 miles.

The accompanying table gives an analysis of the cost of service of motor bus operation for the year ended Dec. 31, 1920.

At a meeting of the National Editorial Conference of Business Papers, held in Chicago, on Oct. 24, a message was read from Secretary of Commerce Hoover, who said, in part: "The editors of the business press have shown a fine spirit of service. Your opportunity for leadership is unique and unchallenged. Upon you rests in large measure the responsibility of the control of industrial thought and opinion in the detail of the industrial, economic and technical problems which confront us. I wish your conference every success in carrying forward your high and constructive purposes."

New Type Bus Installed in Baltimore

The Motor Bus Has a Knight Sleeve Valve Motor and a Semi-Steel Body—Seats Twenty-five Passengers—Operates on Regular Schedule

ON SUNDAY, Oct. 16, the Baltimore Transit Company put into regular service on its Charles Street motor-bus line one of the new-type Republic Knight motor buses having a composite or semi-steel body. This motor bus has a seating capacity of twenty-five and can carry approximately fifty per cent standees. If figured on a basis of 2.5 sq.ft. per passenger the carrying capacity is fifty.

The motor bus is of the type recently displayed at Atlantic City during the association convention. The body was built by the Hoover Wagon Company, York, Pa., and has oak sills and flooring with ash posts and car lines reinforced with steel gussets and angles. The roof, which is practically flat, is covered with Agasote. The inside panels under the window sills are three-ply Haskelite with gum wood for the outside finish. The outside panels are sheathed with sheet steel. The windows are drop sash and so arranged that they do not drop entirely out of sight but act to prevent passengers from sticking their heads and arms outside of the bus.

THE NEW BALTIMORE BUS, WITH ITS SINGLE 15-IN. STEP AND 26-IN. SERVICE DOOR, IS CONVENIENT TO BOARD

THE INTERIOR FITTINGS AND THE UPHOLSTERED LEATHER SEATS, WITH PLENTY OF KNEE ROOM, MAKE FOR A COMFORTABLE RIDE

Ventilators, three on a side and staggered, fit in over the drop sash side windows. Hale & Kilburn stationary seats, with Fabrikoid imitating Spanish leather covering, are used. A novel feature of the seat arrangement is the method employed to obtain more knee room with the cross-seats on 28½-in. centers. This is done by cutting in the seat-backs so as to give a 10-in. knee room in addition to the 17-in. cushion width.

Inside lighting is furnished by six dome lights just over the advertising racks, using 16 cp. lamps. There are in addition lights for a Hunter roller sign, a step light, a fare-box light, and the usual tail and head lights.

The driver has an excellent vision in all directions, as will be noticed from the illustrations. This was accomplished by using round glass in the front vestibule windows.

The power plant consists of a four-cylinder Knight sleeve valve motor having a 4⅛-in. bore and 4½-in. stroke. A Clarke rear end and Fuller transmission with four forward and a single reverse speed make up the power plant units.

This type of motor bus is the result of a special study on the part of the Republic Truck Company and has been designed solely with the idea of providing safety and comfort of passengers. It is by no means a common motor truck chassis mounting a special body but has been designed new from the ground up. With a wheel base of 176 in., a track tread of 66 in., extra long springs on both front and rear axles, Morand cushion wheels and Firestone cushion tires, the bus has excellent riding qualities.

As for convenience of passenger interchange, the service door, which is at the front on the right, has a clear width of 25 in. and folds inwardly; the seats are so arranged that the largest amount of standing space is over the rear axle. This arrangement makes it possible to keep the aisle, which is 18 in. in width, practically clear of congestion. The seating arrangement is illustrated in the interior view.

The bus as operated was fitted in as a part of the regular schedule which calls for a six-minute headway, except during rush hours, when a three-minute headway is maintained. The route is 3.3 miles long and extends from the center of the city to University Parkway via Charles Street. The schedule calls for twenty minutes running time, with a four-minute layover at each end, which gives forty-eight minutes for a round trip. The average running speed for the line is 9.9 m.p.h. Considering the grades that are encountered on the outbound trip this is a pretty fast schedule and keeps the operator on the *qui vive*, especially so when there is a large amount of vehicular traffic with which to contend. A detailed story regarding the route in question is given in the ELECTRIC RAILWAY JOURNAL for Jan. 3, 1920, page 13.

Some of the more important dimensions of the bus are given in the accompanying table.

	All Dimensions in Inches
Length over all	264
Wheelbase	176
Minimum turning radius	336
Length of body	216
Outside width	88
Inside width at seat cushions	84
Headroom	75
Height of floor—light	28
Height of floor—loaded	27
Height of step	15
Height of riser	13
Size of tires (*a*)	34 x 4
Cross seat centers	28½
Type motor	Knight Sleeve Valve
Cylinder diameter and stroke	4⅛ x 4½

( ) Single tires on front wheels; dual tires on rear.

Rectifier Substations Developed Abroad

Conversion of Power on Heavy Electrification Systems in Europe Is Being Made with Mercury-Arc Rectifiers in Conjunction with Rotary Substations—Arc Apparatus Perfected with Outputs Up to 900 Amp. at 800 Volts

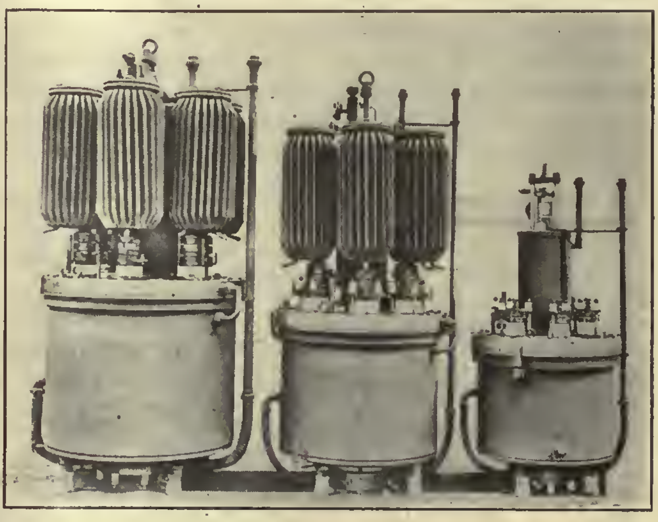
By J. H. Milliken
Midstates Engineering Company, Chicago, Ill.

WITH a record of 100,000 kw. of installed capacity in Europe, the large power rectifier has reached a point where it merits consideration in American practice. The development work in Europe has been carried on and the apparatus brought to its present state of operating efficiency by Brown, Boveri & Company of Baden, Switzerland.

Recently this company received an order in connection with the electrification of the Chemins de Fer du Midi (one of the large railroads in France), which includes three rectifier substations of 3,600-kw. capacity each, one rectifier substation of 4,800-kw. capacity and several rotary-converter substations, two of which latter are to be automatically controlled. The specification under which these rectifiers were purchased requires that they shall be able to withstand 50 per cent overload for thirty minutes and 200 per cent overload for five minutes. The applied pressure will be 1,500 volts for lines equipped with third rail and 3,000 volts for lines equipped with overhead trolley in the heavier traffic zones. Information at hand about this electrification work is very meager, but it is understood that this railroad has heavy passenger and freight service over a line including heavy gradients. The weight of trains is 480 tons and the locomotives have an output of 1,400 hp. and weigh sixty-five to seventy tons. They are provided with regenerating equipment, this accounting for the necessity for some rotary-converter substations, as it is impossible to return power to the alternating-current line through the rectifiers. The converter substations will therefore be located at those points favorable for regeneration.

In addition to the Midi Railroad, three other French railways, Paris-Orléans, Paris-Lyons-Mediterranean, and Chemins de Fer de l'Etat, have accepted the direct-current system for the electrification of their lines, employing rectifier substations. It is understood also that a 500-kw. 550-volt substation, supplied with 8,500-volt, 42-cycle primary current is in use in railway work in Milan, Italy. Another is in use in Asnières, France, of 300-kw. capacity at 600 volts. The Birmingham Corporation of England has a 275-kw., 450-volt equipment at Harbone substation.

In constructing the large power rectifier the results obtained from the glass-bulb type are of little assistance as the aspect of the problem is entirely changed. One of the principal problems connected with this apparatus, but one which with the bulb type was quite simple, has been to make a tank of sufficient capacity that would be absolutely tight under all conditions. Without going into detailed description, it is sufficient to say that in the apparatus under the present state of development the problem of sealing has been solved satisfactorily.

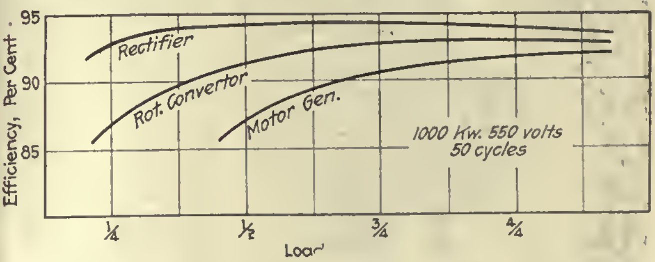


Three Standard Units Designed for Direct-Current Output at 300, 600 and 900 Amp. at Any Voltage up to 800

The rectifier consists of an arc chamber or cylinder having a cylindrical extension at the top, both cylinder and extension being built of steel plate. The arc operates in the arc chamber between the main anodes, of which there are six when six-phase connection is used, and the cathode or body of mercury in the bottom. The arc is started by an auxilliary ignition anode which automatically makes contact with the mercury cathode when the circuit through a solenoid operating this anode is energized.

Supplying each rectifier bank or individual cylinder as the case may be there is a stepdown transformer suited to the conditions of primary voltage on the supply line and delivering current to the rectifier at a voltage suited to the required direct-current output. This requirement is similar to that of rotary convertors, though the ratio of secondary voltage to the direct-current voltage differs from that of either the three-ring or the six-ring converter.

The rectifier economizes floor space as the cylinder unit need not be accessible for operating attention, all operating being done from the switchboard. The cylinder unit is not heavy and has no moving parts, so foundations are not required and it may be placed on galleries or on floors in buildings not especially designed for substations. If erected in the center of the room, ducts or conduit for cable or bus must be provided in or below the floor slab.

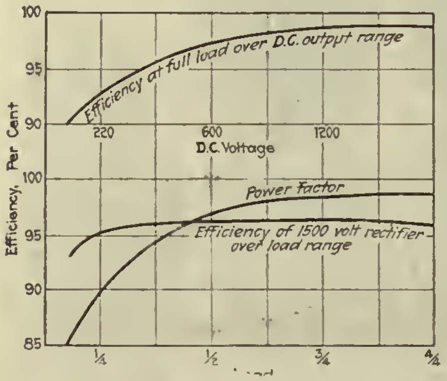


Comparison of Efficiency of Steel-Clad Rectifier, Rotary Converter and Motor-Generator Over Load Range

The simplicity and ruggedness suit it especially to automatic and portable substation uses. The attendants in a non-automatic substation need have no more skill than would be demanded for a transforming station, as the operating functions are no more involved than switching. The standard single units now in production and use are:

Type	Amperage	For Voltages Up to
G 3/16	300	800
G 4/6	600	800
G 5/6	900	800
HG 3/6	300	1,200

The units work perfectly when banked in parallel, anode reactance coils being used if they are fed from a common transformer. They can be worked also in parallel with any type of direct-current apparatus such as rotary converters, motor-generators or storage batteries. The parallel operation in bank with proper distribution of load is fixed so that no adjustment of voltage is necessary when putting in or taking off units. Compounding is provided as required to take care of voltage change to meet changing load. Adjustable output voltage through a wide range is possible by imposition of an induction regulator upon alternating-current supply.



SOME CHARACTERISTICS OF THE STEEL-CLAD RECTIFIER

One of the most pronounced advantages of the rectifiers, particularly for peak, mill and railway work, is its remarkable overload capacity. The short-time overload capacities are as follows:

Duration of Overload, Minutes	Per Cent of Normal Rating Permissible
2	300
5	200
10	150
30	125

There is no flashing over or damage to the rectifier from external short circuits. Momentary short circuits do not affect the apparatus at all, and severe ones are, of course, cleared by the usual protecting breaker.

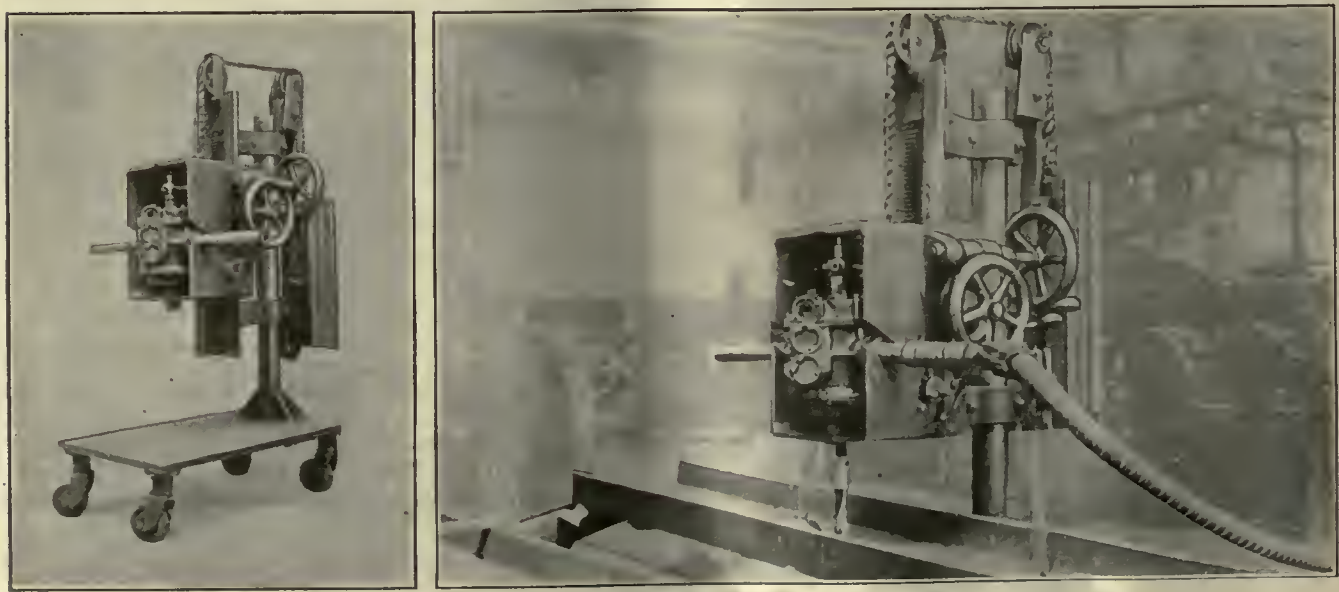
The characteristics of the units evidence high power factor over all, very high unit and over-all efficiency at all loads, and excellent regulation with compounding where required. The power factor averages around 95 per cent, and the efficiency at full load varies from 92 to 98 per cent, depending on the direct-current output voltage utilized.

The efficiency of a cell itself does not change with the load current, but in taking account of complete plant, transformer and auxiliaries must be included. From the accompanying curves it will be seen that the efficiency remains virtually steady down to one-quarter load, when these fixed losses have a marked lowering influence on the curve. It may also be that the rectifier has considerable advantage over the rotary at less than full load and somewhat better efficiency at full load. The very high and almost flat efficiency curve of a rectifier supplying 1,500 volts direct current is shown in one of the curves.

The records of a number of stations that have been in service for a sufficient length of time for observation indicate that the apparatus gives reliable performance with very small maintenance cost.

Portable Air Drill

ACCOMPANYING illustrations show a form of portable air drill which was designed by F. P. Maize, master mechanic of the Portland Railway, Light & Power Company, Portland, Ore., to drill 15-in. x 41-ft. channel iron for freight cars. After use on this particular job it was found of great convenience for other work, as it drills as fast as an ordinary drill and can be easily attached at any desired location. The air drill is mounted in a cage and slots are cut for the arm, and the feed screw is screwed tight against the top. This holds the drill tightly in place, and the cage can be moved up and down by a feed at the side of the machine. By this construction one man can handle the machine very easily and make rapid changes. One illustration shows the machine drilling a 41-ft. channel iron.



AT LEFT, HANDY PORTABLE AIR DRILL. AT RIGHT, AIR DRILL IN OPERATION DRILLING CHANNEL IRON

New Type Vacuum Oiler

Oil Is Supplied to the Top of the Waste Packing From an Oil Chamber Added to the Top of the Bearing Housing and Welded to the Cover

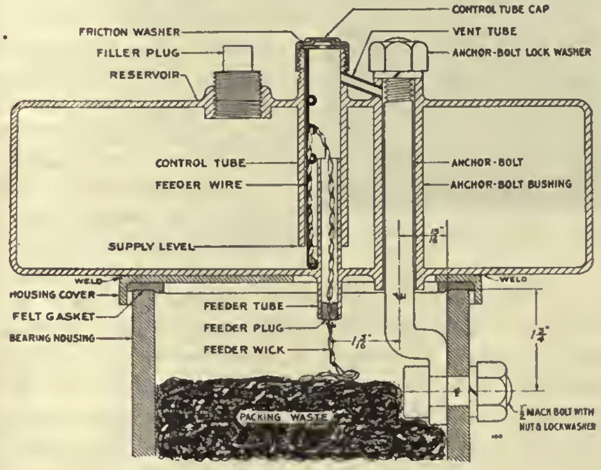
LUBRICATION is a vital factor in the efficient operation of electric railway equipment, for upon it depend both continuity of service and economy in maintenance. The actual cost of lubricants is small in its relation to other operating expenses, but the expense of replacing equipment parts damaged or destroyed through lack of proper lubrication sometimes amounts to a large item.

Armature bearings are considered as the most vital of all the bearings in electric car equipment, since a hot armature bearing usually results in damage to the costly windings of the armature. Several methods of lubrication for railway motor bearings have been tried, but oil and waste lubrication is the one now universally used. The basic principle of oil and waste lubrication is capillarity, which is afforded by the interstices or spaces between adjacent fibers and strands of the waste, through which oil is supplied to the bearing. The rate of oil flow with waste packing is dependent upon four factors—first, the height of capillary lift; second, the effective cross-section of the mass; third, the viscosity of the oil, and fourth, the difference in saturation density at the two ends of the mass. With a modern motor this means that the rate at which oil is supplied to the bearings depends upon the distance between the oil in the bottom of the housing and the bearing, the amount and compactness of the waste in contact with the axle, the thinness or thickness of the oil, and the rate at which the revolving shaft or axle reduces the saturation of waste at the point of contact.

The efficiency of railway motor lubrication is impaired by the fact that the packing waste cannot be maintained in the proper saturated condition at all times. With the older types of motors the reason is the inability to control the oil feed against the combined factors of capillarity and gravity. With later types of motors it is difficult to maintain the oil level at a fixed point, and, as a result, the rate of feed varies. The efficiency of lubrication is also impaired by the entrance of dirt and other abrasives into the bearing housings each time the covers are opened for oiling or inspection by improperly fitting covers and weak or broken cover springs.

VACUUM OILER INSTALLED ON COVER OF MOTOR HOUSING

In an endeavor to overcome some of the difficulties of keeping waste properly saturated, the Railway Improvement Company, New York, has placed a new vacuum oiler on the market. This consists of a cylindrical steel reservoir, which can be mounted on the top of the bearing housing. By welding the oiler to the cover, both the cover and oil chamber can be held firmly in position by use of an anchor-bolt bolted to the housing. An anchor-bolt bushing passes entirely through the oil chamber so that the assembled oiler and cover can be slipped over the anchor bolt and fastened by means of a nut and lock washer. The top of the reservoir also contains a removable filler plug and a control tube. A feeder tube extends from the inside of the control tube through the housing cover with its lower end just above the level of the waste packing. The lower end of this feeder tube is closed with a felt plug through which passes a feeder wick, composed of special wool strands. From the feeder tube this wick passes through a wire loop and then down the control tube to the bottom of the reservoir.



CONSTRUCTION OF VACUUM OILER

The rate of oil feed necessary will vary with different types of motors, the character of the service, the quality of the oil used, the packing waste, the viscosity of the oil and the bearing clearances. Different rates of feed are provided in the oiler by varying the height of the upper end of the wick. To provide for this, the feeder wire has three loops through which the wick can be passed, and thus the capillary lift is increased or decreased to meet the conditions.

Two capacities of oilers are being furnished. The type D oiler is suitable for motors up to and including 60 hp. It consists of a steel reservoir 3 in. in diameter and 10 in. long with a capacity of 8 gills. For motors above 60 hp., the type DD oiler, having a 3½-in. x 10-in. reservoir and a capacity of 12 gills of oil, is furnished.

Electric Power at a Million Volts

SUCCESSFUL generation of electric power at more than 1,000,000 volts at commercial frequencies has just been accomplished at the High Voltage Engineering Laboratory of the Pittsfield Works of the General Electric Company. In the course of the experiments the gap spacings for sphere and needle spark gaps were carefully checked up and prolongation of existing curves (750,000 volts and below) were found correct up to 1,100,000 volts.

Arc-over tests were also made on strings of standard 10-in. suspension insulators up to 1,100,000 volts. The laws of corona were checked at similar potentials and found to hold. A short transmission line was tested for corona conditions and results indicated that a line using 4-in. diameter conductors or larger would be necessary at 1,000,000 volts.

Machine Makes Pre-Treatment Incisions in 500 Ties per Hour

A MACHINE for making incisions in ties to secure the maximum penetration of a preservative that is applied later has been operating in the lumber yard of the Charles R. McCormick Company at San Diego, Cal. This is the same machine described in the ELECTRIC RAILWAY JOURNAL for April 30, 1921, page 819, but as set up at San Diego the arrangement is such that ties are handled very rapidly.

EDGE VIEW OF A PERFORATED DOUGLAS FIR TIE

Instead of a greased plank formerly used in conveying ties to and from the machine a motor-operated chain conveyor is now employed and the crew consists of four men for unloading ties, one for watching the chains, one mechanic and four men for loading ties onto cars. This makes ten men in all. With this arrangement 3,600 ties can be handled in eight hours. As about an hour each day is lost in switching cars to and from the machine, the actual maximum rate of passing ties through the machine is about 500 per hour. Several hundred thousand ties were treated by this process at San Diego for the Santa Fé Railroad.

Paint Spraying Saves Time

A COMPRESSED air paint spraying machine has recently been installed by the Los Angeles (Cal.) Railway for painting trucks. The equipment is called the Aeron painting system and is sold by the De Vilbiss Manufacturing Company of Toledo, Ohio. Results from the use of this machine show that a truck can be thoroughly painted in less than five minutes, whereas the handwork previously took about forty minutes. Owing to the difficulty of reaching all parts of springs by hand painting the work is particularly tedious and slow. The mechanical department of the Los Angeles company rates the paint-spraying machine as a 75 per cent improvement over the hand-painting method. With this equipment three lines of hose are attached to the paint jar. One carries compressed air from the compressor tank to the jar, another carries air through the jar to the handle, and the third carries the paint to the handle. The force of the spray is regulated by the handle, which is shaped like an automatic pistol and works with a trigger. A safety valve on the paint jar prevents excessive pressure.

PAINTING A TRUCK WITH THE PAINT SPRAYING MACHINE

The tank has a capacity of 7 gal. and has a seamless pressed steel shell with welded bottom. The cap is made of cast steel with handles for carrying and for screwing it down so as to render it airtight while in operation.

Double Capacity Air Brakes

THE Virginian Railway operates over heavy grades, some of them as high as 1.5 per cent down grade, and near Elmore the trains have to be pushed up a 2.07 per cent grade. The rolling stock on the Virginian consists of very large cars; for example, 1,120-ton coal cars and the most powerful steam locomotives in the country. The braking problem under these conditions is very serious because the weight of the cars when empty is only one-quarter of the gross weight loaded and because the grade necessitates adequate control. With single capacity brakes the braking force developed is constant in magnitude but varying in relation to car weight. The usual practice has been to design the brake layout so as to provide the highest fractional percentage of braking force on the empty car and then to accept whatever reduced braking ratio might be available for the loaded cars. Usual percentages were 60 for the empty and 15 per cent for the loaded. Any compromise design for the conditions on the Virginian Railway was impossible, so a double capacity brake equipment was used, the layout being designed to provide for 40 per cent braking ratio for an empty car and 40 per cent for the loaded car. The additional force required to raise the braking ratios on loaded cars is obtained by the combination of an additional cylinder and increased leverage, a small load reservoir supplying the additional air.

When the equipment is set for empty car operation the take-up and empty cylinders, which are built in one structure with a small piston operating within the larger, operate as one 10-in. cylinder similar to the standard single capacity brake. When the equipment is set for loaded car operation the take-up cylinder piston first takes up the slack in the rigging and brings the shoes firmly onto the wheels. Then the empty cylinder piston moves out a slight amount, its clutch gripping the notched push rod of take-up cylinder piston, thus supplying additional force. Finally, as the brake pipe reduction continues, the load cylinder moves out a slight amount, gripping its notched push rod and adding to the force already developed through the connecting rods and levers. By this method of slack take-up and short travel of the larger piston the volume of air required for a given application is reduced to a minimum. The new brake was tested out on a train consisting of 100 loaded 120-ton capacity cars and the brakes operated to the complete satisfaction of every one concerned. Among the witnesses of the test were four men who were present thirty-five years ago at the famous Burlington test of the Westinghouse air brake, which did much to cause the universal acceptance of that type of brake on American railroads. This new development is applicable to heavy electric cars.

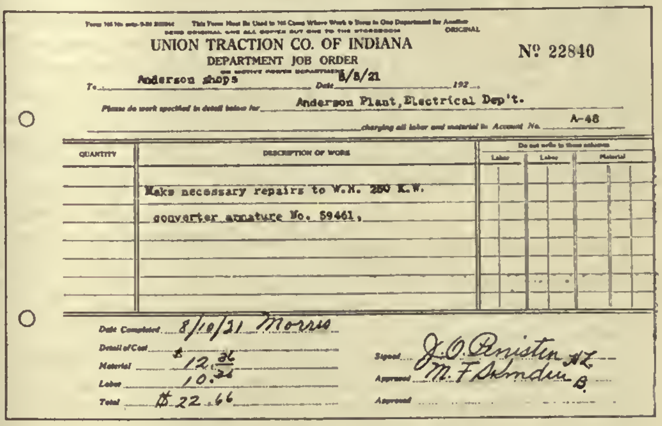
Keeping Armature Repair Records

Careful Record Kept of All Work Done in Armature Repair Department of Union Traction Company of Indiana from Time Armature Is Removed from Service

THE accompanying forms illustrate the methods of keeping records of work done in the armature repair department of the general shops of the Union Traction Company of Indiana, at Anderson. All armature repairs are taken care of at this point with the exception of the work done by one armature winder at the Muncie shop. When an armature is removed from service an armature record tag is attached to it. This tag consists of two parts and gives information as to the cause of removal as well as a complete record of the repairs as carried out, and finally, a record of its reinstallation when again placed in service. All armature repair tags are sent to the office of the master mechanic at the Anderson shop, where a record is kept of all work done.

In addition to the records furnished by the armature repair tags, a daily report is made out by the armature room foreman and sent to the master mechanic's office. This report gives the type and number of the armatures, the defect found and the cause of the trouble. It also includes information as to the repairs made. At the end of each month this information is tabulated in the form of a monthly report to the master mechanic and to the superintendent of motive power. This tabulation gives the various defects which occur for each type of armature owned. The company has fifteen different types of railway motors in service, and a scheme for numbering the armature shafts has been worked out which has proved very convenient and also prevents mistakes as the various types can be readily identified by the numbers.

The first two figures of the number used indicate the type of motor and the following number or numbers indicate the serial number of the armature. For example: Westinghouse No. 112 motor armature has 12 for the first two figures. Similarly the type 121 has 21. The 303 has 03, and the General Electric 205 has 05 as the first two figures of the armature number. The armature repair department also makes repairs to motor generator and converter armatures for the electrical department. This work is taken care of by a department job order, which is issued by the department having the work done. One of the accompanying forms shows the type of order used. Five copies are made of each order. The original copy accompanies the job, the second sheet is sent to the timekeeper, the third is filled in in the master mechanic's office with the date of receipt, the fourth copy is sent to the superintendent of motive power's office, and the fifth copy is kept by the department of issue. When the job is completed the original copy is sent to the office of the master mechanic with the date of completion and the foreman's O.K. This is then sent to the timekeeper and the copy in the master mechanic's file is sent to the office of the superintendent of motive power with the date of completion noted thereon. The storeroom office furnishes the timekeeper with the cost of material used, and this, together with the cost of labor, is entered on the original form. This is then returned to the department of issue for the information of those particularly interested in the work.



ORIGINAL

UNION TRACTION CO. OF INDIANA

DEPARTMENT JOB ORDER

Nº 22840

To Anderson shops Date 8/8/21 192

Please do work specified in detail below for Anderson Plant, Electrical Dep't.

charging all labor and material to Account No. A-48

QUANTITY	DESCRIPTION OF WORK	Labor	Labor	Material
	Make necessary repairs to W.H. 250 K.W.			
	converter armature No. 59461,			

Date Completed 8/10/21 Morris

Detail of Cost

Material $12.36

Labor 10.30

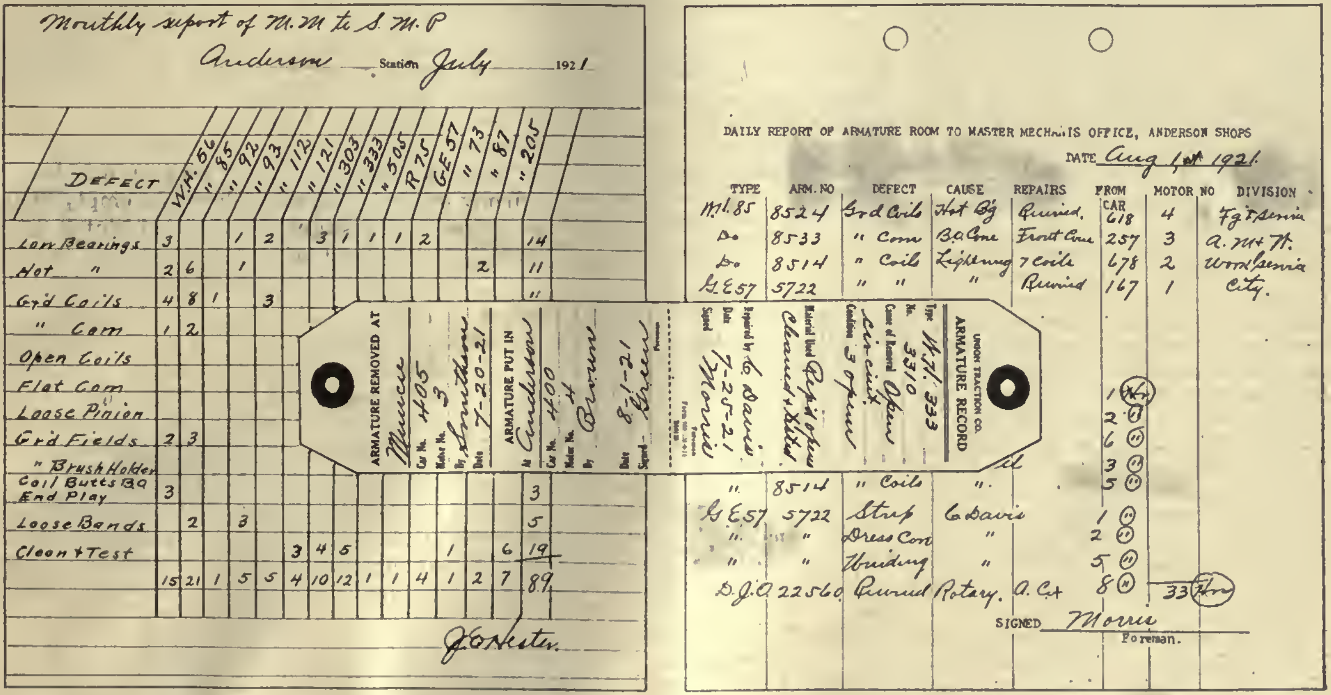
Total $22.66

Signed J. O. Rister

Approved M. F. Anderson

Approved

Form Used for Job Orders



Monthly report of M.M. to S.M.P.

Anderson Station July 1921

DEFECT	W.H. 56	" 85	" 92	" 93	" 112	" 121	" 303	" 333	" 505	R 75	GE 57	" 73	" 87	" 205	
Low Bearings	3			1	2		3	1	1	1	2				14
Hot "	2	6		1									2		11
Grd Coils	4	8	1		3										"
" Com	1	2													
Open Coils															
Flat Com															
Loose Pinion															
Grd Fields	2	3													
" Brush Holder															
Coil Butts B.Q. End Play	3														3
Loose Bands		2		3											5
Clean + Test						3	4	5				1		6	19
	15	21	1	5	5	4	10	12	1	1	4	1	2	7	89

J. O. Rister

ARMATURE REMOVED AT Muncie

Car No. 405

Motor No. 3

By Smithson

Date 7-20-21

ARMATURE PUT IN

At Anderson

Car No. 400

Motor No. 4

By Brown

Date 8-1-21

Signed Green

Foreman

UNION TRACTION CO.

ARMATURE RECORD

Type W.H. 333

No. 3310

Cause of Removal Open circuit

Condition 3 open

Material Used Repaired open, Cleaned & tested

Repaired by C. Davis

Date 7-25-21

Signed Morris

Foreman

DAILY REPORT OF ARMATURE ROOM TO MASTER MECHANICS OFFICE, ANDERSON SHOPS

DATE Aug 1st 1921

TYPE	ARM. NO	DEFECT	CAUSE	REPAIRS	FROM CAR	MOTOR NO	DIVISION
W.H. 85	8524	Grd Coils	Hot Brg	Rewired.	618	4	Fg't Service
Do	8533	" Com	B.O. Cone	Front Cone	257	3	A. M. & N.
Do	8514	" Coils	Lightning	7 Coils	678	2	Work Service
G.E. 57	5722	" "	"	Rewired	167	1	City.
					1 Hrs		
					2 "		
					6 "		
					3 "		
"	8514	" Coils	"		5 "		
G.E. 57	5722	Strip	C. Davis		1 "		
"	"	Dress Com	"		2 "		
"	"	Winding	"		5 "		
D.J.O. 22560	Rewired Rotary.		A. C+		8 "	33 Hrs	

SIGNED Morris

Foreman.

At Left, Monthly Reports of Armature Defects. At Right, Daily Reports of Armatures Repaired. In Center, Armature Record Tags

Manufacturers' Problems Discussed

Mr. Thirlwall Gives Data on Recent Improvements in Electric Railway Equipment—Mr. Pellissier Describes the Buying Problems Which the Railways Are Called Upon to Solve

A "TWO-HEADER" meeting of the New England Street Railway Club was held in Boston on Oct. 13. The afternoon session was devoted to two addresses on the problems of the railway company and the manufacturer. George E. Pellissier, chief engineer and assistant general manager Holyoke Street Railway, spoke for the railway companies and J. C. Thirlwall, railway and traction engineering department, General Electric Company, spoke for the manufacturers.

MR. THIRLWALL'S ADDRESS

Mr. Thirlwall said that in considering the subject of the discussion he was tempted to suggest that it should be slightly changed to read "What the Manufacturers Have to Sell and What the Railway Companies Have to Buy." The manufacturers have many things to sell, but for some time past apparently there have been comparatively few things the companies felt they were obliged to buy. Broadly speaking, every successful manufacturer has to sell not only the fabricated product of his tools, but the ideas of his designers, engineers and salesmen, and their ability to save money or make money for his customers. In other words, in the long run, it is the ability of a manufacturer to give service to his customers that governs the volume of his sales.

The long period of stationary receipts and of mounting wage and material costs through which the electric roads have passed for the past five years has emphasized the necessity of service from the manufacturer, and in general the manufacturers need not be ashamed of the response. The period has seen many economies and methods of increasing earnings worked out by both operators and manufacturers. For instance, the Birney safety car is adding directly some $12,000,000 or $13,000,000 to this year's net earnings of the 275 companies using these cars, and indirectly, through rapid extension of one-man operation of other cars made possible by its success on the Birney type, has saved probably another $2,000,000. The development of other types of low-wheel, lightweight cars and of their equipment, and of automatic control for substations, are simply a few of the many contributions manufacturers have made to the concerted effort to help traction companies in their struggles for existence.

The speaker then pointed out some of the important developments made during the past twenty years, saying that he referred not only to those undertaken by the General Electric Company, but by all of the manufacturers of railway materials.

He first referred to power stations with their change in prime movers from reciprocating engine drive, with 25-cycle power and 5,000-kw. unit maximum, to turbine drives with 60 cycles and 45,000-kw. unit maximum; to the development of the diversified load in central stations and to the saving in fuel, attendance and lower reserve capacity accomplished during the period mentioned. The change in fuel consumption from these improvements is from 5 to 6 lb. of coal per kilowatt-hour for a small engine-driven generator to 2 lb. of coal or less per kilowatt-hour for the large turbine. There has been a corresponding saving in energy consumption of cars. On the basis of 36,000 miles and 4,000 hours per year the old double-truck car would take about 180,000 kw.-hr. as compared to 150,000 kw.-hr. for modern double-truck cars and 75,000 kw.-hr. for safety cars. With $7 coal the old double-truck car would cost for fuel per year about $3,150, whereas the cost for fuel with light weight safety car operation and large turbine generation would be only $525 per year.

Similarly the automatic control in substation permits closer spacing of substations, saves copper, increases the load factor, permits a better contact with the power company if power is bought, and saves approximately $3,000 a year in attendance for substations, together with other savings in light losses, etc.

A similar comparison was made between the old heavy, split-frame nonventilated motor with poor commutation, grease lubrication, soft bearing metal and gearings with the modern motor which weighs from 30 to 40 per cent less for a given working capacity so is less in first cost and has an average cost of maintenance of only 50 to 60 cents per thousand miles or $18 to $22 per year, as compared with six to seven times that amount for the old type. This is in addition to its greater reliability, which means fewer cars held in and fewer road failures. Small wheel design also saves weight in body and truck. The speaker also referred to control and brake improvements and in shop equipment, mentioning among the latter, banding lathes, baking ovens, electric hoists, paint-spraying machines, air-blowing machines for electrical equipment, armature slotting machines, pinion pullers, hot water heaters for mounting pinions, acetylene and electric welders, testing outfits for fields, armatures and other apparatus, etc. In conclusion the speaker said:

"We have all trimmed our sails during the passing storm; our prices have followed the receding waves of post-war inflation and are back to what we believe to be a fairly stable basis; we are in most lines prepared to make quick deliveries of standard material; we are anxious for orders."

What the Railway Company Requires and What It Should Buy*

The Function of a Railway Is to Furnish Satisfactory and Adequate Transportation as Cheaply as Possible and All Efforts Should Be Devoted Toward Accomplishing This Result

BY GEORGE E. PELLISSIER

Assistant General Manager Holyoke (Mass.) Street Railway

FIRST—A railway's primary function is to furnish satisfactory and adequate transportation facilities to the whole community it serves at a cost which will be as low as possible consistent with the service required by the community, and this cost should include a return on the money invested in the enterprise sufficient to attract new capital and to act as an incentive to economical management.

Second—The industry should be conducted as a monoply subject to public regulation and control.

Third—The industry is entitled to all the rights, privileges and obligations of any other like industry under the constitution.

Viewed from this standpoint, what the street railway industry needs most, I believe, and what it has always needed most, is men with the capacity for real leadership as executives and operators. At the present time I know of no industry of like importance and magnitude which has fewer of the right kind of men available or a smaller reserve from which such men can be developed. I say this without any desire to disparage or discredit the work of those who have worked faithfully and hard, but who in many cases have not obtained results.

RELATION OF TRANSPORTATION TO INDUSTRY

The real trouble began with the promoter, who had few of the virtues and all the failings of the pioneer and a lot of failings that the pioneer did not have. He did not have the fundamental knowledge of the relation of transportation to industry, of the proper function of a street railway, of his duties and his obligations and even of his rights, or, if he had the knowledge, the courage to assert them has been demonstrated by the results. These men were rarely of the type that could make two blades of grass grow where one grew before, but sometimes were able to make one blade look like two, and thus established a reputation for good management wholly undeserved and created the impression that the industry was a gold mine.

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*Abstract of paper read at a meeting of the New England Street Railway Club, Boston, Oct. 13, 1921.

This impression led naturally to the demand on the part of the traveling public for extension of service, lower fares, reduction of dividends, and finally public regulation, which was interpreted to mean authority without responsibility. With leaders lacking the power of analysis, lacking the knowledge of the actual cost of operation, lacking in many instances the knowledge of their rights and the courage to assert them, the industry followed the lines of least resistance and acceded to demands and regulations which should have been resisted to the limit. Expediency, not principle, was their guiding motive, and I regret to say that in many organizations the traditions then established still persist, with the result that such organizations are not only in a much worse position than the average but they have also done much to destroy the confidence of the public in the integrity of the industry, causing the innocent to suffer with the guilty.

When, as a result of decrease of fares, extension of service, added maintenance expenses due to age, wear and tear on physical property and accrued depreciation, revenues decreased and operating expenses increased the property was allowed to deteriorate and service to be impaired in the attempt to keep up dividends. To further aggravate the situation, wages in all other industries began to go up, accompanied by the labor organization movement. The failure of street railways to keep pace with other industries in increasing wages led to lack of cooperation, even where there had been any, strikes and general demoralization.

Hence, I repeat that the greatest need of the street railways today is for men with constructive minds, men who combine administrative ability with technical ability, men with vision, courage, enthusiasm and zeal for accomplishment, and who have the ability to select and inspire their co-workers with the same qualities, men of culture and initiative, thoroughly grounded in the fundamentals and trained for the work they have to do. Men of sincerity, integrity and broad human sympathies, and having a well-developed sense of values. Men capable of obtaining highest efficiency from the human element and enlisting the spirit of the men in the ranks, which after all is the most important part of the men.

GOOD WORKMANSHIP REQUIRES GOOD TOOLS

What else do street railways need? Obviously, to furnish satisfactory and adequate transportation facilities at a reasonable cost, they need proper physical equipment. As the mechanic cannot do good work without tools, neither can the railways give good service without proper facilities, and at the present time the tracks, rolling stock and equipment of many companies, together with the facilities for maintaining them, are nothing less than atrocious.

Railways should buy the best material for the purpose required, all things considered, including cost, and it may not be the best or the cheapest thing available which should be purchased. As an illustration, if a company has 200 motor equipments of a certain type and requires two more, even though motors of another type with 5 per cent greater efficiency at 5 per cent less cost could be obtained, it would not be justified in changing standards, thus increasing the stock of repair parts necessary simply to avail itself of the slight gain in efficiency and cost, unless it had definitely decided to abandon the type it had altogether.

In the smaller organizations, where the executives may have to perform the duties of heads of departments, this problem is not so difficult, provided they have the necessary qualities of leadership, but if some of the essential qualities are lacking, their absence will be more noticeable than in the large organizations, just as one discordant note is more noticeable in a solo than it would be in an orchestra of fifty pieces.

PRINCIPLES TO BE FOLLOWED IN PURCHASING

In the larger organizations the absence of some of the necessary qualities of leadership will not be so apparent if the qualities of some members of the organization supplement those of the others, but when any of the members lacks a well-developed sense of values there is always danger that the interests of the whole are subordinated to the interests of a part. The engineer, for instance, may insist upon material conforming to his specifications regardless of cost. The purchasing agent may insist upon buying the cheapest because it will make a better showing for his department. The storekeeper may refuse to honor a request from the maintenance department for material until the proper amount of "red tape" had been unwound, even though in so doing the work might be halted and the company put to a loss, whereas the true interests of the company as a whole would lie in giving the true value to each element, taking whatever action was necessary to obtain the best results for the company as a whole. In purchasing, my own belief is that special specifications be avoided so far as possible, as they are bound to increase the expenses, and in many instances material made to these specifications actually is no better than the standard material of the manufacturers or that called for in the specifications of the A. E. R. A.

I further believe that street railways should purchase their material rather than manufacture it, unless there is some special reason for doing so. In most instances where companies think that they can manufacture for less than they can buy, I believe that a proper cost accounting system would show them to be in error, and this applies particularly to the smaller companies. When it comes to buying rolling stock and equipment, I believe that the greatest importance should be attached to the relative value of each element entering into the decision, and, having carefully analyzed the requirements, that material should be purchased which best fulfills the requirements, nor do I believe there can be any such thing as a standard car which will fit all conditions. All types undoubtedly have their field, but the attempt should not be made to crowd any particular type into the field for which it is not fitted, whether by companies or by manufacturers, and I might say here that the element of the likes and dislikes of the public should be taken into consideration. Adequate service does not necessarily mean satisfactory service.

This brings up the question of the position of the relation of the manufacturers to the street railway companies in supplying their material needs. It is my belief that the manufacturers' efforts should be confined to developing and supplying apparatus which they and the railways consider necessary. I believe their selling efforts should be confined to the companies with which they are doing business, and not devoted to propaganda directed at the general public with the view of compelling the adoption of devices which the manufacturers have perhaps designed without intimate knowledge of the requirements of the situation and which they desire to sell.

I also believe that in designing such apparatus the chief aim of the manufacturers should be to develop the best thing for the purpose rather than something distinctively their own product. In the long run it will be for the interest of the manufacturers as well as for the street railways for them to supply what will best meet the requirements of the situation, and in some instances good salesmanship might dictate the purchase of the other fellow's material rather than the purchase of material unsuited for the purpose.

Tenth Annual Safety Congress Held at Boston

AS AN adjunct to the National Safety Council, which held its tenth annual safety congress at Boston Sept. 26-30, the electric railway section has almost held its strength through the period of depression. Chairman J. H. Mallon, assistant general superintendent of transportation of the Metropolitan West Side Elevated Railway, Chicago, presented an encouraging report to the opening session of the section on Sept. 27. He stated that 110 electric railway companies hold membership in the section today. Sixteen dropped out during the year and seven joined, so that there was a net loss of nine. Under the circumstances, calling for curtailment of expenses, it is encouraging to the movement that a larger number of firms have not withdrawn. Chairman Mallon, however, deprecated this form of economy. When the street railway company maintains a safety organization, perhaps expressed through its affiliation with the electric railway section, it induces the employees to feel that the company is more considerate of its employees and its passengers, and they, in turn, become more considerate and careful.

With these brief observations, Mr. Mallon opened the meeting, named his nominating committee and introduced as the first speaker Miss Laura M. Roadifer, the safety expert for the Philadelphia (Pa.) Rapid Transit Company.

An abstract of this paper was published on page 745 of the issue for Oct. 22.

At the second session John E. Cullen, assistant to the president United Railways & Electric Company of Baltimore, gave a talk on the attitude of the public toward the railway participation in no-accident-week campaigns. Mr. Cullen prefaced his remarks on this subject by giving a comparison of the former policy of silence of railway companies in regard to accidents and the present policy of frankness, and he cited instances of both methods experienced by him when he was a reporter on a newspaper. He showed clearly that the latter policy pays both directly and indirectly. He then described a "no accident" campaign conducted recently in Baltimore. The railway company with which he is connected took a prominent part in this campaign. It carried streamers and posters on the inside of the cars and placards on the outside with the slogan "Don't get hurt," and the motormen when passengers got off said the same thing. The speaker said that the plan was not only directly helpful, but he believed it convinced the public that the company was endeavoring in every way to do the right thing. The speaker also referred to the increase in hazards caused by the large number of automobiles now on the streets but said that it has been held in Baltimore that the street car has the right of way at every intersection over the vehicles.

A paper was also presented on railroad crossings and crossing signs by R. S. Messenger, claim agent Rochester & Syracuse Railroad. An abstract of this paper was published on page 744 of the issue of the ELECTRIC RAILWAY JOURNAL for Oct. 22.

The new officers of the electric railway section of the council are as follows: Chairman, B. D. Haskins, Chattanooga (Tenn.) Street Railway; vice-chairman, H. B. Potter, Boston Elevated Railway; secretary, M. W. Bridges, Metropolitan West Side Elevated Railway, Chicago.

Local Ownership of Utilities Emphasized

West Virginia Association Addressed by Governor Morgan and J. P. Barnes of Louisville Railway—Sale of Securities Locally Will Follow Clean Publicity and the Gaining of Bankers' and Editors' Confidence

ATTENDANCE at the annual convention of the Public Utilities Association of West Virginia in session at Charleston, W. Va., on Oct. 20 and 21 was representative of every portion of the state. The membership represented a total assessed valuation of $30,000,000, it was stated by Secretary A. Bliss McCrum, in his annual report. The membership includes all the important utilities in the state, with three exceptions, and it was planned to extend the membership so as to take in something like 150 small telephone companies, which will make the association include every line of public utility in West Virginia. C. P. Billings, manager of the Wheeling Traction Company, predicted that the coming year will see the association take rank among the best in any of the states in the country.

The association re-elected all the old officers as follows: Herbert Markle, Bluefield, president; C. P. Billings, Wheeling, first vice-president; Mentor Hetzer, Moundsville, second vice-president; E. W. Alexander, Charleston, third vice-president; A. M. Hill, Charleston, treasurer; executive committee: C. C. Bosworth, Elkins; W. R. Power, Huntington; A. H. Grimsley, Clifton Forge, Va.; A. C. Babson and C. S. McCalla, Charleston, and C. H. Brues, Wheeling.

The banquet the first day was one of the most successful occasions of the kind ever held in Charleston. Herbert Fitzpatrick, Huntington, acted as toastmaster. Governor E. S. Morgan, who formerly served as chairman of the Public Service Commission of West Virginia, was one of the speakers, and this previous connection made his talk the more interesting to the utility men. Judge E. D. Lewis, present chairman of the commission, also made an address. Fred M. Stanton spoke for the utilities, and the principal address of the evening was made by James P. Barnes, Louisville, president of the Louisville Railway.

Mr. Barnes treated the "pressing problems of public utilities" after the fashion of a medical adviser. He divided his subject into three classifications: (1) A study of symptoms, (2) diagnosis of ills, and (3) treatment for their correction.

"Influenza may stalk through the country claiming its thousands of victims," said Mr. Barnes, "just as the unregulated jitney may strike into the utility world, claiming its victims among the transportation companies. This does not argue unsoundness of the modern transportation system, but rather represents a new menace to the public life and welfare against which new or keener prophylactic safeguards must be employed. Truly, in the past, stocks may have been manipulated and property accounts watered in the interest of individuals. Admittedly this is not good business today, neither does the present physician bleed his patients, yet who shall say that many lives were not prolonged to the benefit of posterity by the old and now discarded methods of the practitioner? Blood renews itself, so has capital in many instances, and generally the true corporate history will show that the renewal of capital has not been from excess earnings but from withheld dividends.

"Auto-intoxication comes also from the disuse of normal organs. One who fails in self-analysis is failing in one of the ordinary processes of assimilation and elimination and will sooner or later find clogged with dead matter the channels which should be devoted to clearing normal business matters. In all too many cases this condition is the result of mental laxness or downright ignorance of cause and effect. The diagnosis of our public utility ailments has been delayed for many of us because of the acute discomfort of the symptoms. Our tendency has been to treat the symptoms in the hope of immediate relief from discomfort rather than seek to treat the disease."

Mr. Barnes advocated "the knife" as "treatment" and declared that "all deformities should be the source of "immediate operation." After that he advocates the "antiseptic treatment" looking to the "general upbuilding of the patient. No antiseptic for the ills of the public utilities equals the clear sunshine of fact," he emphasized. "All truth, comfortable or uncomfortable, must be recognized as truth. Clean publicity is for the corporation as clean living is for the individual, the surest safeguard against infection. Publicity is not necessarily advertising propaganda nor carefully constructed news stories. The most effective publicity may be and usually is a full and frank discussion of all corporate matters with every inquirer.

"Times have improved," he said, "the public conscience has awakened, individual conscience has awakened, the public is better represented today in its officials, elected and appointed, generally speaking, than it was in the past. Business morals have improved and with this general improvement there has been a vast improvement in the corporate morals of public utilities. Business practices generally recognized in generations past as not only defendable but admirable, would today meet a storm of protest and execration around any directors' table. Public utilities may be suffering from earaches in New York, ulcer in Detroit, cancer in Des Moines, but this does not imply fundamental weakness or unfit-ness in the utilities themselves. Local irritation may produce a strange and unusual symptom requiring special treatment."

C. P. Billings, manager of the Wheeling Traction Company, told of the recent troubles that company had encountered and how the sale of 3,200 shares of stock to 1,300 different people had helped shape unwieldy public opinion. Mr. Billings advised the sale of stock through the employees of the company, contending that the employees knew the working of the corporation and that if the company was deserving they would recommend the purchase of the stock to their friends and kinsfolk.

A. H. Grimsley, of the Virginia-Western Power Company, Clifton Forge, Va., declared that "Every bank and newspaper in the territory served by a public utility should advise those who put their trust in bankers and confidence in editors to buy of the preferred stock of the utility.

"Any banker that will not do this if the utility is earning operating expenses, full depreciation, fixed charges, preferred stock dividends and has proper equity behind the junior securities is avowing himself as so selfish that he would rather have the use of the money of his depositors than to see them buy gilt-edged securities," said Mr. Grimsley. "Every editor who fails to boost will be advertising himself as a grouch who prefers to see public utilities owned by foreign capital than by home folks. All that is necessary is for the public utility to deserve the trust of bankers and the confidence of editors. If the public utility can't send a satisfactory statement to the bank and can't convince the editors that it is responsible, I take the position that there ought not to be a ready sale for its securities."

This phase of the relation of public utilities to the communities served came before the convention for discussion following an address by Judge George R. Wiles, of the Public Service Commission, on "Advantages of Local Financing."

PUBLIC OWNERSHIP A FALLACY

"The Utopian idea is public ownership of public utilities," declared Judge Wiles, "but the recent experience of the government with the railroads has shown the fallacy of this idea. One of the most valuable assets of a public utility and the most difficult to obtain is good will. The average man looks with suspicion on the average public utility. Most of the utilities in West Virginia are owned by outside capital. Williamson, my home town, has made an effort to sell stock in a public utility through the newspaper recently, which is an encouraging sign. I hope the time will come when the public will look upon the public utility with a more favorable eye."

Discussing the address of Judge Wiles, Mr. Grimsley told how in the old days his company had difficulty in getting an advance in rates; how there would be public meetings which were packed and jammed with indignant citizens. Since there has been an effort to place the securities of the utility in the hands of home people a similar meeting was advertised and twenty people turned out, of whom eighteen were in favor of granting the utility a just increase in rates.

Appeal for Reason in Utility Regulation*

An Encouraging Message from the Retiring President of Commissioners' Association—The Public is Vitally Concerned in Utility Expansion and Must Have Broader Vision in Utility Matters—Adequate Rates and Customer Ownership Urged

By JAMES A. PERRY
Member of the Railroad Commission of Georgia and President of the National Association of Railway and Utility Commissioners

FOR many years there has been a nation-wide agitation looking to the abolition of the rights of the different states to regulate railroads in any manner. The climax of this agitation came with the transportation act of 1920, as construed by the Interstate Commerce Commission. The construction of this act by the Interstate Commerce Commission outlaws state regulation and strikes at the very fundamentals of our system of government.

I have not the slightest doubt that one of the chief financial troubles of the carriers of the country today is the fact that rates, both freight and passenger, are so high as to result in an aggregate loss rather than a gain as contemplated. High freight rates, especially in cases of short hauls, have done more for the growth of motor transportation of freight than has all the progress of motor transportation itself, which necessarily results in a loss to the railroads.

If the construction of the transportation act of 1920 by the Interstate Commerce Commission is to remain the law of the land, a most hurtful blow has been given our dual system of government—a form of government that has stood the test of time, and chiefly because its form provides for representation of the people, for the people and by the people. The provision that it is by the people is, so far as concerns the regulation of our commerce, partially defeated and the right of local self-government is destroyed in the present construction of the transportation act.

It has always been with the individual states that we have gone forward in the first efforts of any new idea pertaining to our commerce. If proved good in one state, other states can take it up, and finally it becomes national in its scope. Far better that one state try it, should it be unwise, than for our entire country to be subject to an expensive experiment. State regulation of rates needs the demands of local traffic conditions, where an intimate knowledge can be quickly applied, whereas at one common center the truth in most cases will never be known. Remove, if you will, the state lines and you still have the problem of reasonable local rates, and to be fixed by one central body that can never have more than a smattering idea of the real local conditions. . . .

Rates that are higher than the traffic will bear stop the movement. All over the country, for comparatively short hauls, essential commodities are costing less than the freight to move them to market, with the result that in many intrastate movements motor power is hauling a good percentage of short-haul freight. . . .

Railroad property is as much the property of stockholders who put their money into it as your home and my home is property of ours. And when it is dealt with by any consideration other than that obtaining when the rights of private property are being considered, a wrong is done, first, to the man who has invested his money in the particular railroad; second, to the public, who, in the end, cannot hope to have the service, regardless of rates, if in the meantime the property has been destroyed by prohibitive operating costs and unremunerative rates.

There has been too much misunderstanding between the public and the railroads in this country. I am not unmindful that railroads here and there throughout the country have been guilty of the foolishness of seeking and receiving unnecessary benefits from legislatures now and then—only to serve their purpose for a while, with the result that an outraged people rise up to correct the wrong and, as is often the case, go so far as to do a real injustice to the railroad that ends with a loss to the public and the railroad alike. The railroads of this country can no more carry on their business in this country without the co-operation of the people they serve than they can get along without equipment, and this business of seclusion by centralization of all regulation of service and rates at Washington is going to prove the greatest hurt to the railroads and the commerce of this country that either has ever experienced.

The question of rates for utility properties has been one of nation-wide concern for several months. Dating from some two years ago, there is no question to my mind that any regulatory commissions throughout the country made the common mistake of holding light and power, gas and street railway companies to rates that were too low, hoping that the immediate future would amply justify the rates prescribed. This hoped-for condition was not realized. The experience was just the opposite of what we had expected to see. The raw materials going into the manufacture of the products sold steadily increased in price. Finally, when business generally became depressed, public utilities had been required to do business on such small returns that they were not in a position to withstand, even for a short while, an increase in actual losses already sustained.

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*Abstract of presidential address delivered at annual convention of National Association of Railway and Utility Commissioners, held in Atlanta, Ga., Oct. 11-14, 1921.

The public at once took the position that public utilities should not expect normal returns, but should endure with other business enterprises slight or no returns at all and, if need be, increased losses.

The law by which regulatory commissions are governed required them to prescribe just and reasonable rates, and the courts throughout the country have declared that a just and reasonable rate is one that with competent management will afford the utility a reasonable return upon the fair value of its property being used in the public service.

Just compensation for the use of private property by the public is a constitutional right which cannot be denied. It is the fair value of the physical property devoted to the service that must control, and it does not matter whether it came as a gift from earnings of years past, actual investment or otherwise.

The public is interested in the utility having such rates as will insure a reasonable return upon the fair value of its property, thus guaranteeing not only an unimpaired service, but such development from time to time as will always be sufficient to meet the requirements of constantly increasing demands for service.

At the present time, in many instances, a utility files an application with the regulatory board of the state in which it operates. This done, a copy of such application is served on the municipality affected by the change proposed. It makes no difference what the relief asked for may be, the mayor and council meet and promptly vote to instruct the city attorney to oppose the granting of the relief sought. No investigation is made as to the justice of the relief petitioned for, the city attorney is directed to oppose it, not to investigate and ascertain the truth, as information for the mayor and council, before action is taken one way or the other.

REGULATED MONOPOLIES ON TRIAL

We seldom hear of a municipality under such circumstances making an investigation and ascertaining if there is any merit in the claim of the utility company. Seldom investigations are made, little information is had, and seemingly none is desired.

This, of course, is an unfortunate situation. In the end it will be overcome, but not without loss to the utility and the public while such a condition prevails. Competitive business had its day and failure. Regulated monopolies are now on trial. The public is still paying 100 per cent more for some merchandise than the same article sold for four or five years ago, but the thought of paying 50 per cent increase in utility rates as compared with prices for such service three and four years ago meets with scant sympathy. . . .

The public is vitally concerned in the expansion of utilities because a city can never grow faster or extend further than her utilities reach. The utilities of a community are the greatest developers any city ever had. No city can build beyond the lines of her street railroads, and this is true to a degree in comparison with the area covered by gas mains.

WILL CAPITAL BE FORTHCOMING?

Few sections of this country can finance utility development of any kind from local capital. The financial necessities of development, therefore, carry us to foreign fields for money. Is there a man anywhere, regardless of his business interest, with surplus money for utility investments, who is going to send his money into communities where there exists a citizenry hostile to foreign capital for such investment? Even worse, will such a man send his money into a state for such investments where the state regulatory board refuses rates that will earn even less than the lawfully prescribed rate of interest as a return for utility service? Will such money find its way into a state where condemnation of such property is the talk of the day?

The public should see to it that such conditions do not exist. It has an interest greater than the selfish interest of the few who would stop the utility development of every community while their political ambitions are satisfied or a personal grouch is assuaged. It is a sad picture to see a community of inflamed citizens following the leadership of one man, or even several men, in an effort to handicap or destroy a local utility, all because of selfishness on the part of the few self-appointed leaders. This kind of thing has got to stop in this country, otherwise the public will pay the high price of stagnation in such growth, with a breaking down of the service now rendered.

PUBLIC IS WILLING TO PAY FOR SERVICE RECEIVED

What the people desire most is efficient service, so long as it is furnished at a reasonable price. This they are willing to pay. They have a right to expect both efficient service and reasonable rates at the hands of regulatory commissions. Is it not high time that the public and utility companies throughout the country were coming to a better understanding? . . .

The public is concerned in seeing that light and power companies, both steam and hydro-electric, are built in such large units and so connected as to cover a radius sufficient to overcome the interruptions in service resulting from high and low water, storms, breakdowns and other causes, all of which come at intervals and in spots; and by a proper arrangement for exchange of output between such large companies interruptions in service longer than the time consumed in throwing in a switch would never be heard of. . . .

The time has come when the public must have a broader vision in handling these questions if we are to keep pace with our opportunities for growth and development. We have got to get away from a local consideration of services of this kind. Far better for us that the lights we use in our homes and the power we use in our local enterprises be derived from power even hundreds of miles away from us, with such an interrelation of service as has just been mentioned, if by such an arrangement we have an added guarantee of continuous service.

SECURITY HOLDERS MUST INCREASE IN NUMBER

I cannot believe the public will stand for a reactionary program that will certainly carry us back to crude methods, with less service and at higher rates. We may halt, temporarily, here and there over the country, but in the end electric power supply, as well as other utility services, is going to be carried on in a wholesale manner. Any other method is squarely in the teeth of the very fiber of our people and form of government. There are 1,450,000 citizens of our country who have invested in the securities of the electric light and power companies of America. This number should be increased many times. Indeed, such a new class of investors may in the end become the only solution of the problem of financing the present needs of our utility companies—saying nothing of the future—if such companies are to keep pace in development and expansion as the public needs require. Either the public will have to assume and practice a more friendly attitude toward capital belonging to the other fellow or the public will have to put up the cash, and from a class who have heretofore studiously avoided such investments.

This brings us face to face with the issue confronting the public utilities of the nation today. They have not the financial strength of expansion, and in many cases this came to be so from the fact that they have been required by regulatory boards to operate on rates that were too low. This issue should be presented to the public that it may decide for itself the manner in which such financing hereafter shall be done. If private citizens refuse to furnish the money, then the public must inform the other fellow that efforts at condemnation or confiscation of his property will not be tolerated.

Utility Commissioners Discuss Motor Buses

The Consensus of Opinion Seems to Be that the Motor Bus Is Not Dependable Without Proper Regulation—Bus Companies Are More In Favor for Passenger Transportation than Independents with a Single Bus

AUTOMOBILE transportation, omnibus and jitney, furnished the subject for a round-table discussion at the thirty-third annual convention of the National Association of Railway and Utilities Commissioners in Atlanta, Oct. 11-14. That there was much interest is evidenced by the remarks of several of the commissioners. All seemed to recognize that the jitney motor bus as a competitor is a serious menace to other organized forms of transportation. Regulation has entirely eliminated this form of wild-cat competition in some states, while in others it goes on unrestricted. Commissioner Lewis, Iowa, believed it utterly ridiculous to expect independent jitney operators to furnish adequate transportation to any community. Such transportation must be by large companies that can be depended upon to give regular service, pay their share of road upkeep, taxes, and other obligations to the community. Public utility commissions ought in every way to discourage the independent jitney operators until they meet these requirements. The afternoon session on Thursday, Oct. 13, was devoted to a round-table discussion on "Automobile Transportation—Omnibus and Jitney."

THE NEW JERSEY JITNEY SITUATION

In opening the discussion, Harry V. Osborne, New Jersey Board of Public Utility Commissioners, who presided, said the jitney problem in his state was a serious one and it was presenting questions that were very difficult of solution. New Jersey has one of the largest street railways in the country, operating as it does more than 800 miles of track. The jitneys have absorbed about 25 per cent of its normal traffic with the result that the traction company is deprived of approximately $5,000,000 per year. This railway has complained very bitterly of this heretofore unrestricted jitney competition and with some justice, for it is entitled to reasonable protection on account of its large investments. Moreover, this protection is primarily in the interest of the public, though it must necessarily be contingent upon the ability and upon the policy of the company to furnish adequate service.

The problem has two aspects: first, its effect upon existing rail transportation systems, that serve a very large proportion of the public; and secondly, the effect on street traffic, particularly in the larger cities, where congestion has become so acute that it is almost impossible for anybody to use the streets. In Newark at the intersection of Broad and Market Streets there are 30,000 vehicular movements every day. That is a considerable tide of traffic to be obstructed by the none too carefully handled jitney.

The New Jersey commissioners are anxious to know what to do with the problem and it was not until last winter that the commissioners had any jurisdiction. Prior to that time all licenses for jitney operation were obtained locally from the various municipalities through which the buses were to operate. No other form of permit was recognized.

COMMISSIONERS GET JURISDICTION

As a result of considerable agitation on the part of Public Service interests as well as jitney interests the legislature gave the Public Utility Board a limited jurisdiction to the extent that all new jitney applicants after March 15, 1921, must have their permission to operate. That was not very much jurisdiction, but it was at least a start. This Legislature immediately raised the question as to what was meant particularly with reference to renewals of licenses. When an operator sold his bus was the vendee a new applicant or should he be allowed to continue as a matter of course to operate the bus because the original license was granted prior to March 15? The board in passing on this question construed that the legislature had, when the law was enacted, determined upon a fixed policy and placed its stamp of approval upon all buses operating on or before March 15 last. Incidentally that limited the number of jitneys with which the board had to deal, unless it appears upon hearing, as stated in the Becker decision, that the conditions have changed so as to make some other determination necessary.

TITLE TO BUS TRANSFERS APPROVED

All such applications up to the present time, have been heard and notices of the hearings have been given the railway company operating along the route in question. Where it was found that the application was for a mere renewal of an existing bus in operation, the application was granted as a matter of course under the Becker case decision.

In the case of a new line, planning to tap territory not already served by an existing street railway line but which must of necessity parallel an existing railway line to reach the center of the city, it automatically comes under the jurisdiction of the board. In such cases, the jitney is allowed to serve the new territory but it is prohibited from doing any local business when in competition with the existing trolley line, if it is shown at the hearing that a sufficient amount of service is being rendered by the trolley car company.

LEGISLATIVE VS. JUDICIAL RATE MAKING

Another aspect to the matter, which is going to be serious, is the encroachment of the Federal Court in the matter of rates. This happened in the recent case of the Public Service Railway. The commissioners had fixed a valuation of approximately $82,000,000 on the property, which the president of the company aptly declared was worth $200,000,000 for rate-making purposes. The board later granted a slight increase in the unit rate of fare, in the form of an additional cent for a transfer in the belief that it would meet the situation. The company immediately took the matter into the Federal Courts on the grounds of confiscation and in six or eight hours, in an *ex parte* application, the court granted an injunction and fixed a rate. Due to the protest that arose all over the State, the judge, either for that or some other reason, of his own volition rescinded the order fixing the rate and convened a special statutory court of three judges to say whether the rate set by the board was confiscatory. (See ELECTRIC RAILWAY JOURNAL, Oct. 8, 15 and 22, 1921, for decision of the statutory court—EDITORS.) Rate fixing, the new Jersey board holds, is not judicial but a legislative function and if the Federal Courts under any such guise are to fix rates the state commissioners might as well go out of business.

The question of jurisdiction over freight trucks in New Jersey has not yet been raised. On account of the expression in the statute "Jitneys or auto buses," it presumably will be a matter for later construction by the commissioners as to whether it is broad enough to include freight as well as passenger traffic.

REGULATIONS IN STATE OF WASHINGTON

In the State of Washington, according to E. V. Koykendall, director, the Department of Public Works has been given jurisdiction over all passenger and freight motor vehicle transportation by the last Legislature. The law became effective on June 6 last and provides that all motor transportation companies operating in good faith on Jan. 15, 1921, shall be granted certificates of public convenience and necessity so as to continue their operations. Under the law an auto transportation company is defined as any company transporting either persons or property for hire between fixed termini and over a regular route. New companies must apply to the Department of Public Works for a certificate before they are entitled to operate, regardless of whether their operation is in competition with any other existing transportation company. Where there is a transportation company already in the field the law provides that additional certificates will not be granted unless that company refuses to furnish transportation to the satisfaction of the Department of Public Works.

In the State of Washington about a thousand applications have already been filed with the result that stage and truck operations are perhaps greater than those of any other state except California. This is due mostly to the large mileage of hard surface roads and to the excellent character of other improved highways. There are some stage companies operating in Washington today whose annual revenues will reach nearly $500,000.

The department has had great difficulty in determining when to assume jurisdiction in the case of freight transportation by motor truck, especially in the cases where the company has no fixed termini or regular route, although tariffs based on weights and mileage are published.

CERTIFICATES REFUSED IN COMPETITIVE TERRITORY

Another question that has arisen refers to competitive services in substantially the same territory. So far the department in determining the question of public convenience and necessity for a new line has taken into consideration other existing means of transportation. If after a hearing it is concluded that the transportation furnished by the steam railroads, electric roads or steamboat lines in the immediate territory was sufficient and if reasonable and adequate service was already afforded by these existing lines, the application of the stage or motor bus company was refused. Sometimes, when the stage route did not parallel the rail lines but detoured several miles to reach towns and villages not otherwise served, a certificate has been granted. Many railroad attorneys have questioned seriously whether the department should take into consideration railroad or other transportation systems in granting a certificate of public convenience and necessity to a stage line, for the peculiar wording of the Washington statutes provides that "if the territory is already served by a certificate holder no additional certificates shall be given unless the existing companies fail to furnish the required service."

MOTOR BUS AND AUTO TRUCKS ARE COMMON CARRIERS

All motor-bus and auto-truck lines in the State of Washington are considered as being common carriers, and are required to file tariffs and schedules showing the time of arrival and departure at each point served in the same manner as a railroad.

In the case of stage companies engaged in interstate traffic, jurisdiction has been assumed and exercised on the theory that while the Constitution of the United States grants the power to Congress to regulate interstate commerce, Congress not yet having seen fit to exercise that power in so far as motor vehicle transportation is concerned, the local state authorities may do so. This view, it is believed, will be upheld by the courts. It has been in a number of decisions in the past.

In New Mexico it was pointed out by Hugh H. Williams, of the State Corporation Commission, that on interstate lines to Arizona the State attorney general had held that they were common carriers. Under the State law these carriers are required to file only tariffs, giving a thirty-day notice of changes in rates. There is nothing in the law as it now stands to prevent competition on the same route between these auto carriers.

Continuing, Mr. Koykendall said the view taken by the department in applications for certificates for the operation of stages or motor trucks in competition with steam railroads has been not to grant them where transportation is already adequately cared for, unless the applicant desires to serve some communities, towns or villages which are not reached by the railroad. In some instances certificates have, however, been granted for operation in such competitive territory with certain restrictions, namely that service is permitted between two termini but prohibited in intermediate territory which was already adequately served by other means of transportation.

The wisdom of carrying that theory very far is doubted, for it provokes a good deal of trouble. Passengers waiting on the road always want to board the first bus that comes along, and to have regulations that prohibit one of these carriers from handling intermediate traffic means a complaint, for the passenger wants to know why he was passed up.

The Washington Department of Public Works has made no restrictions as to equipment. It has specifically decided that it was not the purpose of the law to limit operations in so far as equipment or frequency of schedule was concerned, as it existed on Jan. 15, 1921. In other words, it has been construed that it was not the purpose of the Legislature to block the wheels of progress, and if an operator wanted to change his Ford for a Packard or to improve his schedules he was not interfered with. Complaints, however, as to inadequate service are handled in exactly the same manner as against a railroad company.

All-year-round service depends entirely on conditions. The law permits a stage company to cease operations when conditions make it impossible to carry on operations. Generally speaking, though, certificates are not granted where operations can only be carried on a short time each year on the theory that it is an impracticable proposition. There are, however, many services that are seasonal, such as to Rainier National Park and to Mount Rainier and in such cases where conditions warrant it certificates are granted.

LOSS AND DAMAGE LIABILITIES

Under the law either a $10.000 bond or insurance policy is required against loss of property and personal injuries for each passenger-carrying motor vehicle, with a loss accruing to any one individual of not to exceed $5,000 for any one accident. The department has also adopted a rule requiring an additional amount based on the passenger-carrying capacity of the vehicle. As for the freight-carrying vehicle it must have a $1,000 bond against property damage. These requirements make it as safe to travel by stage in the State of Washington as it is on the railroads.

In some cases the department believes the size of the bond required should be reduced but under the law this is impossible. This is especially true in mountain territory where it is impossible to operate a heavy car over the roads. Take for instance a mail carrier in the mountain districts who has a Ford and wants to carry passengers. The traffic is very light. To do so he must pay a premium of $300 to $400 per year for a bond and often his entire passenger income amounts to less than $100 per year. Moreover, some passengers, particularly in the sparsely settled districts, are willing to use such transportation facilities as may be afforded at their own risk. There should be some elasticity in the statute, it is believed, so that the department can make special provisions for liability to meet such particular conditions.

FEEDERS TO INTERURBAN LINES

In Washington an electric line can either arrange with an independent stage operator to extend its route to another point as a feeder and conduct it in conjunction with its own operations, or it can operate its own stages on such an extension rather than laying tracks and stringing trolley wires. That may be challenged in the courts but it has not been done so far. A railway company must, however, apply for a certificate, put up a bond and do everything that is required of the independent auto stage company.

There has also been adopted a rule which prohibits any one abandoning stage service without the consent of the department. If services are abandoned for no reason for a period of four days or more the operator must obtain a new certificate of public convenience and necessity before operations can be resumed; in other words, abandonment of service means forfeiture of the right to operate until the operator can show that conditions warrant resumption.

MARYLAND CONDITIONS

In Maryland, as pointed out by E. B. Whitman, the Public Service Commission has jurisdiction over both passenger and freight-carrying vehicles. All such operators must get a permit from the commission before operating. The conditions under which these permits are granted follow very closely those already outlined for the State of Washington. The same can also be said of the difficulties met with.

In Baltimore, with the exception of one jitney line which was inherited by the present commission, independent motor buses are prohibited. Motor buses are, however, at present operated by the traction company on one of the principal streets. During the past year there have been a number of applications for bus lines in different parts of the city, some of which were badly needed. In the spring the question of operating these lines was taken up with the United Railways & Electric Company. The railway company, however, was not anxious to take up bus operation. The commission nevertheless kept after them and told them that permits would be granted to individuals if they did not operate bus lines in certain territories where transportation was needed. This brought the railway company around to the commission's point of view, namely, that the transportation systems of the city should be interdependent. They are now studying the whole transportation question and only recently their president and their general manager have returned from abroad after a study of motor-bus and trackless-trolley operation. It is expected that the railway company will soon install bus lines in territories not now adequately served by the trol leys and where the cost of rail service would be too great to make it possible to earn a return on the money invested.

Where independent bus lines come in from the country they are not permitted to compete with the local railway but must make their terminal the point where they connect with the trolley line.

During the five years the commission has had jurisdiction it has found that the big lines give better service than where a route is covered by two or three independent operators. With these small fellows on the route the difficulty is in getting rid of them. A good many go out of business after their bus reaches the point where it needs repairs or is worn out, and it has been the policy of the commission in such cases not to reissue the permits to anyone else for a small part of what might be later a big system. The only solution of many difficulties is in having large companies, and even now when issuing permits for small sections they are conditioned on their getting off the road if a larger bus line comes in which will serve the community better.

In speaking of trackless trolleys Mr. Whitman said that he understood from investigations made by the commission that a trackless trolley could operate on a fare of about 2 cents per mile. Experience with motor-bus lines is that the fare must be between 4 and 5 cents per mile to come out whole.

Maryland has one of the best systems of state roads to be found in the country. The State has for many years been improving its roads systematically so that now it possesses a good many thousands of miles of improved roads. It is on 6 miles of these roads that come into Baltimore that the commission is asking the railway to install a trolley bus, as that part of the country is developing very rapidly and needs transportation.

Lewis E. Gettle, of the Wisconsin Commission, stated that the Milwaukee Electric Railway & Light Company is urgently insisting on putting in trolley buses for extensions rather than track in the newly-developed portions of the city. The commission has a very great doubt whether such a system would be a street car line or a bus line.

THE DES MOINES SITUATION

In Des Moines, the largest American city without street cars, Dwight N. Lewis of the Iowa Railroad Commission said that for the last six weeks the people had been dependent on jitneys without regulation for transportation. There have been a good many accidents. There is not much to be said except that these buses ought to be regulated. It is utterly ridiculous to expect independent jitney operators to furnish adequate transportation to any community. There must be companies of sufficient size to render a service that can be depended upon, and they should be regulated to pay their just share of the expense of keeping up the roads and the taxes of the community. They should also have such capital behind them that they can take care of their obligations to passengers and to the community; otherwise Public Utility Commissions ought in every way to discourage them until they meet these requirements.

The point has not yet been reached where the street railways can be dispensed with; that time may come and auto transportation so developed that it can be used in our communities. That time will not come until there is some adequate provision for their regulation, operation and maintenance.

In answer to the question as to why the street cars were discontinued Mr. Lewis stated that the railway company found it utterly impossible, with an 8-cent fare, to pay its operating expenses, let alone a return on its securities, with 5-cent jitney competition paralleling its lines for short hauls that took the cream of the business. The Iowa Commission is without jurisdiction in the situation.

With reference to freight transportation he also said there is a very necessary place for the auto truck due to the high freight and express rates for short hauls. With good roads and adequate regulation this institution has come to stay for handling short-haul freight.

Closing Sessions of Utility Commissioners

AT THE final session of the National Association of Railway and Utility Commissioners, held in Atlanta, Ga., on Friday, Oct. 14, the following were elected officers to serve during the following year: President, Carl D. Jackson, Wisconsin Railroad Commission; first vice-president, Dwight N. Lewis, Iowa Board of Railroad Commissioners; second vice-president, Alexander Forward, Virginia State Corporation Commission. Detroit, Mich., was selected as the meeting place of the next convention, which will be held on Sept. 26, 1922.

An account of the sessions on the first two days of the convention, Oct. 11 and 12, was published on page 708 of the issue of this paper for Oct. 15, and a report of the afternoon session on Thursday appears in this issue under the heading "Utility Commissioners Discuss Motor Buses."

The session on Thursday morning was devoted to the presentation and discussion of committee reports on federal and state legislation, litigation and valuation. The first named committee reported its efforts to have the Esch-Cummins bill amended to define more clearly the power of the states with reference to intrastate rates. As a result of this report the association adopted a resolution urging congress to amend the Esch-Cummins bill in such a way as not to relieve carriers from conforming to the laws of the states with respect to construction and operation within the states for intrastate transportation or with respect to the abandonment of such transportation. The committees on litigation and valuation devoted almost their entire attention to questions dealing with steam railroads. The latter committee reported its efforts to procure an amendment of the valuation act to relieve the I. C. C. from the obligations to include in its valuations its estimate of the "present cost of condemnation and damages in excess of original cost or present value" of lands.

At the session on Friday there was an address by M. H. Aylesworth, executive manager of the N. E. L. A. and former chairman of the Colorado Public Utilities Commission. Mr. Aylesworth's remarks were devoted largely to the subject of customer ownership of utilities. He pointed out that the results of such ownership can be observed in many sections, since at present more than a million and a half people own the securities of light and power companies under private management. Under such conditions not only are the best interests of security-holding customers represented in the development of electric service to suit the development needs of any community, but there is a correlation of the business of furnishing electric service with all those lines of business activities which the diversified group of security holders represents.

To illustrate the far-reaching effect of the right kind of "public ownership" and the conditions which make it essential to maintain the highest quality of service, Mr. Aylesworth recounted the events of the Pueblo (Col.) flood, where through the efficient organizations of the electric light, power and telephone companies the restoring of service in remarkably quick time shortened the period of distress by many days and aroused a lively appreciation of the public spirit that was displayed, even at risk to life, by company employees and officials. In a fuller realization of the community-building influence of adequate electric service, Mr. Aylesworth maintained, lies the solution of some of the future problems of the utilities, particularly the urgent need for capital to carry out the developments and betterments that are everywhere required. The selling of securities to the public through customer-ownership campaigns he dwelt on emphatically as one of the vital phases of utility financing in the future.

Traveling Passenger Agents Convene in Salt Lake City

ELECTRIC railroads were well represented at the forty-sixth annual convention of the American Association of Traveling Passenger Agents held at Salt Lake City Sept. 12 to 15 inclusive. Approximately 325 delegates were in attendance.

Among the pleasing entertainment features were trips to Saltair over the Salt Lake, Garfield & Western electric road, a trip to Ogden via the Bamberger Electric, to Ogden Canyon over the Utah-Idaho Central Railroad, where a trout and chicken dinner was served at the famous Hermitage hotel, and a trip to Logan via the Bamberger Electric and the Utah-Idaho Central electric road.

The Canadian Rockies was the selection for the 1922 meeting, one session to be held at Banff, one at Lake Louise and one at Vancouver.

A total of 207 new members were taken into the association at this year's convention.

Officers for the ensuing year were elected as follows:

President, Frederick R. Parry, general agent of the Canadian Pacific Railroad, with offices in New York City.

Vice-president, C. H. Cutting, traveling passenger agent of the Salt Lake Route of the Union Pacific system, with offices in Salt Lake City.

Secretary-treasurer, Paul C. Benedict of the Baltimore & Ohio, at Chicago.

Publicity in Litigated Cases*

No Good Comes from Publicity Given to Injury and Damage Cases

By W. H. MOORE
Claim Agent San Diego Electric Railway, San Diego, Cal.

EVERY question is debatable and there is an affirmative and negative side to every debate. In this particular case I have chosen the negative side. There seem to be more reasons for not giving publicity to litigated cases than otherwise. The least said about injury and damage cases so far as electric railways are concerned the better for the companies we represent.

The first reason is that as a rule the general public is not particularly interested when a public service corporation is successful in a suit. The success of the company arouses an antagonistic attitude usually and it is thought that it is another case of a rich corporation being able to hire shrewd lawyers and the other fellow having had to take what he could get in the way of legal advice.

Publicity to litigated cases of this character is used more or less as a guide post by the next fellow that gets in trouble, and he endeavors to avoid the mistakes of the first fellow as gathered from the published facts.

Publicity creates antagonism among attorneys in general. Many an attorney has an injury case against an electric railway presented to him by a client whom he can hardly refuse to serve. If the case is tried and the company wins and great publicity is given to that fact the attorney, who is a legitimate practicing member of the bar, takes offense at the publicity and feels as though it is a slap at him and in the future feels less sympathetic when he reads of the trouble and tribulations of public service corporations.

Take, for example, the case of an attorney who is presented with an injury case and has confidence that he can recover. The claim agent being equally confident that no recovery is possible and not being able to effect a compromise that is satisfactory to both sides, the case goes to court, with the result that the verdict is found in favor of the company. Publicity then is given to the fact. This attorney naturally takes offense inasmuch as he confidently felt that the claim was an honest one. He feels that the publicity given has a tendency to belittle his ability as an attorney.

Take, for another example, that type of attorney known as an "ambulance chaser." Suppose he presents one of his typical cases in which the allegations are gross exaggerations and you win. Suppose that in our success we come out with great scare headlines, what happens then? The attorney himself might, the next time he has a case against you, give the newspapers an equally good story in retaliation. What is the result? Does it not bring injury and damage cases into the spotlight? Does it not familiarize everybody with the idea that while public service corporations have been known to win cases, they also have been known to have been successful in their defense and have had to pay heavy damages? Does it not make people feel as though they will take the chance, having nothing to lose? I dwell particularly upon the attorney phase for the reason that attorneys are a necessary part of all litigation and it is their elimination that the publicity must have to be effective.

In my opinion the only publicity of value would be a mere mention of the fact that in the suit of Jones vs. the blank electric railway company for damages in a personal injury case the jury found for the defendant. The result is obvious and the least said about the case the more effective, leaving the reader to wonder why the plaintiff lost.

Middle West Claim Agents Organize

REPRESENTATIVES of the claim departments of a number of the electric railway properties of the Middle West held an organization meeting at the Hotel Baltimore, Kansas City, Mo., Oct. 14 and 15. The purpose was to form a permanent organization of the claim men of various electric and steam roads of all the Middle Western states. The following member companies were represented:

Missouri: United Railways of St. Louis, Kansas City Railways, Kansas City, Clay County & St. Joseph Railway, St. Joseph Railway, Light & Power Company.

Illinois: Bloomington Street Railway, East St. Louis & Suburban Railway.

Kansas: Kansas City, Kaw Valley & Western Railway, Hutchinson Interurban Railway.

Other States: Denver Tramway Company, Fort Smith Railway, Tri-City Railway & Light Company, Lincoln Traction Company.

The following officers were elected for the ensuing year: President, W. C. Swisher, Kansas City Railways; first vice-president, Trevor C. Neilson, East St. Louis & Suburban Railway; second vice-president, W. P. Gottschalk, Bloomington Street Railway; secretary and treasurer, Oscar L. Borgquist, Kansas City Railways; member of executive committee, T. G. Kelly, Fort Smith Railway.

American Association News

T. & T. Executive Committee Meets

A MEETING of the executive committee of the Transportation & Traffic Association to plan the work of the coming year was held at the headquarters of the association in New York on Oct. 18. Those in attendance were: L. H. Palmer, president; G. T. Seeley, J. K. Punderford, Arthur Gaboury, and G. H. Clifford.

The executive committee decided this year to discontinue two of the committees which it had last year. One of these committees was the committee on freight, whose work during the past year was largely the drafting of a classification of freight accounts. This gives a basis for comparing the costs of freight accounting. Up to this time comparisons have been largely useless because of the different forms of accounting used. The executive committee believes that now that this classification has been adopted by the association, the most important step is to ask the companies to put the classifications into force. The other work, which would naturally be assigned to a committee on freight operation, would be the methods of promoting freight traffic, and this topic will be transferred to the field of the committee on merchandising transportation. The executive committee also decided, in view of the other subjects which had to be investigated, not to continue the committee on economics of schedules. It was believed that the work of the committee last year was so exhaustive that no further study was required immediately, except possibly in the drafting of additional definitions.

Five committees were agreed upon for the coming year. One of these will be on merchandising transportation, which will include, as stated, the merchandising of freight transportation. Another will be the committee on safety. The other three will be on personnel and training of transportation employees, traffic regulation and the transportation features of safety car operation, including probably the use of one-man cars in interurban service.

As the association has usually had six working committees, it is quite probable that another committee will be added to this list.

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*Abstract of paper presented at the annual meeting of the Pacific Claim Agents' Association, Butte, Mont., Aug. 25-27, 1921.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Strike Moves Condemned

Criticisms Contained in Church Report Are Directed Against Municipality, Men and Company at Denver

The research department of the Federal Council of the Churches of Christ in America made public on Oct. 24 some conclusions contained in a forthcoming report of an investigation of the Denver Tramway strike which occurred during the summer of 1920. The investigation was undertaken at the instance of a group of churchmen in the City of Denver which created for the purpose the Denver Commission of Religious Forces. The Commission on the Church and Social Service of the Federal Council of Churches and the Social Action Department of the National Catholic Welfare Council participated in the inquiry.

The Protestant body was represented in the inquiry by Edward T. Devine, one of the foremost social workers and writers in America, and the Catholic, by Dr. John A. Ryan of the Catholic University of America and Dr. John A. Lapp· a well known investigator and an authority on social legislation.

The strike on the street railways of Denver arose over the termination by the company of its agreement with the Amalgamated Association and the announcement of a serious wage reduction. The company justified its action on the ground that without an increased fare it was impossible to continue to pay the prevailing scale which provided a top wage of 58 cents an hour. On this issue the report states:

> The tramway employees struck because they feared that as soon as the legal obstacle should be removed the company would reduce wages to 48 cents, which it has signified its intention of doing in default of an increased fare; because they believed their union was better able to face a contest in August than it would be in October or November when its morale would be weakened by the loss of its contract with the company, and when unemployment would be more widespread; and finally because they were enraged at what they believed to be a policy, on the part of the company, aimed at disrupting their union.
>
> Whatever may have been the financial condition of the company, the men could not be expected to accept a reduction of the top-wage to 48 cents an hour without the most vigorous and indignant protest. The requirements of an industrial enterprise make it necessary in practice to safeguard stockholders and to pay interest on bonds. Otherwise capital cannot be attracted, and the bondholders will throw the enterprise into bankruptcy. But in principle the men are right—and public policy will vindicate them—in maintaining that labor should be paid a good living before money receives its hire.

The public is declared to have a responsibility in this matter and also for maintaining order without depending on imported guards. On this point the report says:

> It is to be feared that the people of Denver, as is probably true in most cities under like circumstances, for the most part failed to take a broad public view of the tramway strike and of the situation which led up to it. Had the people interested themselves to provide such regulation of the street railway system as would insure its solvency and a living wage to its employees the whole unhappy conflict might have been prevented.
>
> Further, it is impossible to excuse a great municipality for not providing at public expense and under strictly public control an adequate, disciplined police force which would make the importation of armed guards an unthinkable alternative. There is no more disturbing influence in indu at the present time than the tendency to transfer the police power of government to privately controlled agents who are irresponsive to the claims of justice and who are devoid of that discipline which the successful exercise of police power requires. That the consequences of importing armed men to guard and operate the street cars included a heavy toll of life, for which no jury has fixed responsibility, is a disquieting fact which remains a moral liability of the entire community.

Of the use of the "spy system" to combat organization activities on the part of the workers the report says that the "whole system is undoubtedly one of the most disruptive influences in our industrial order."

The publicity methods employed to discredit the strikers are especially deplored:

> A frequent method of attacking labor during industrial controversies is to represent that labor has fallen under the vicious influence of radical agitators. Sober, home-loving and law-abiding workingmen whose patriotism cannot be questioned and whose hatred of every form of anarchy and lawlessness is deepseated both in their ancestry and in their whole education and training, are recklessly and wickedly charged with harboring sentiments which the men themselves repudiate, and with being influenced by outside agitators who exist only in the imagination of their calumniators. This particular kind of misrepresentation is a feature of almost every industrial controversy, and the tramway strike in Denver was no exception. . .

The men are criticised in the report for their precipitate action in striking while their cause was before the courts. On this point the report says:

> After the disturbances of the first week of the strike the men should have made all possible speed to terminate it. It was no time to stand on ceremony. When their executive declared the strike ended, they should have gone back to work.

At the same time the use of the injunction in cases of this kind is declared by the report to be questionable and fraught with danger.

Railway Case to Go Before Full Supreme Court Bench

Associate Justice Pitney of the United States Supreme Court on Oct. 26 refused to grant an order suspending the decision of the United States District Court in New Jersey, under which the Public Service Railway, Newark, N. J., was permitted to increase its fare to 8 cents.

Justice Pitney told representatives of the railway and of the State of New Jersey who appeared before him that in view of the magnitude of the questions involved in the case he preferred that presentation be made to the full bench when the court meets on Nov. 7, explaining that the court might be willing at that time to hear oral arguments.

Des Moines Rides Again

Electric Railway Cars Welcomed Back After Suspension of Seventy-Five Days

After a period of seventy-five days, during which the city depended for transportation upon buses and other makeshifts Des Moines is again riding in the cars of the Des Moines City Railway. Service was restored on the afternoon of Oct. 24 following the passage that morning by the City Council of the franchise proposed by the Harris interests with certain changes suggested by the Corporation Counsel.

The Council passed the franchise without any further modifications and early in the afternoon cars started leaving the carhouses and by the time the rush-hour crowds were ready to go home fifty-nine cars were in operation.

According to an agreement reached by all parties to the transaction buses will be permitted to continue to operate in direct competition with the railway until after the franchise has been voted upon by the people. It was felt that fifty-nine cars were inadequate to handle the situation, but as the present power facilities of the company do not permit the operation of a larger number of cars, it was agreed that during the interim it was best to allow the buses to continue.

As yet no definite plans for the franchise election have been made, but it is thought that the vote will be held Nov. 24 or Dec. 1. Thirty days must elapse between the first notice of the election and the actual vote.

In the event that the franchise receives the support of the voters it is planned to place service on a 132 car basis as soon as sufficient substation equipment can be placed to provide power for this number of cars.

Upon order of Judge Martin J. Wade of the federal court railway service in Des Moines was stopped at midnight on Aug. 3. On Aug. 26, upon the guarantee of officials of the Iowa State Fair Association to protect the company against loss, Judge Wade permitted resumption of service during the eight days of the fair. On Sept. 2, however, the cars were again returned to the carhouses.

Bus operators have announced that they will conduct a determined campaign to prevent the ordinance from being passed at the election.

M. H. McLean, representing the Harris interests of Chicago, issued a statement at the time service was resumed. This statement follows:

> A starved horse never pulled a full load. All that the Des Moines City Railway has ever asked is the right to a fair return so that it can render good service and attract capital for improvements and extensions, that is the right to live and function properly in the community.

> The franchise is based on fundamentally sound principles. Fares are based on the cost of operation plus maintenance of a contingent reserve fund; fares to be lowered or raised as the reserve fund exceeds or falls below prescribed limits. Equally important is the provision that gives an incentive to efficient and economical operation The public must be served. That is of prime importance.
>
> The Council having adopted the franchise, the company will, if it is approved by the people, endeavor to operate under it so as to give first class service.
>
> The recent action of the employees of the company in voluntarily accepting a reduction of wages in order to assist in making possible a resumption of service is highly commendable and evidences their broad minded view of the situation.
>
> I hope and believe that the franchise will be accepted by the people at the election by a large majority and that the vexed question of the Des Moines City Railway will be laid to rest and succeeded by a period of sanity and right dealing in respect to this important factor in the life of the city.

Mayer Barton also issued a statement on Oct. 24. In his memorandum the Mayor called particular attention to the fact that the franchise election would make possible the recording of an expression of opinion which will indicate definitely the extent of the demand which had been made for a resumption of railway service.

From the experience that Des Moines has had, it would seem that the franchise ordinance must necessarily be passed at the coming election. The public, however, has a short memory and political forecasts are always dangerous. Until the ordinance has been formally approved by the voters the need would not seem to exist for going into the provisions of the grant to any greater extent than has already been done in the issue of the ELECTRIC RAILWAY JOURNAL for Oct. 15, page 709, and Oct. 22, page 749.

As late as Oct. 17 Judge Wade felt it incumbent upon him to make a statement with respect to the railway suspension in the hope of making plain the facts which led to the suspension of service. His statement was more than a mere review of the steps fixing the responsibility for the suspension in that he took occasion to offer his service in the attempt to bring about a settlement. He said that his observations were made in order that any further discussion of the problem could be conducted in a spirit of justice, fairness and common decency. In concluding his remarks Judge Wade said that up to the time his statement was made no showing had been presented to the court that conditions had changed in any respect.

The Des Moines City Railway on Oct. 26 filed with the City Council formal notice of its acceptance of the franchise ordinance. Nov. 28 has been fixed by Council as the date for the special election on the franchise. The publication of the application for the franchise checkmates the move of the Improvement League to conduct a fight to test the legality of franchise. No move has yet been made by the Council to reroute buses so as to take them off streets where car lines are operated, but Mayor Barton has intimated that this will be done as a traffic safety measure. Buses which were shipped in to Des Moines from outside cities are beginning to leave the city.

Subway Abandonment Recommended

Committee of Cincinnati Chamber of Commerce Recommends Complete Change in Plans

Abandonment of the canal subway as a rapid transit project, on which the city of Cincinnati already has spent $3,000,000 is recommended in a report made public by an investigating committee of the United City Planning Commission of the Chamber of Commerce.

The committee said it was forced to the conclusion that money already spent on the subway is a dead loss and should be charged off the city ledger and the project of rapid transit abandoned.

The committee which made the report consists of Albert Krell, president of the Central Inland Waterways Association; George B. Fox, manufacturer, and Frederick W. Garber, architect. There is $3,000,000 still unspent of the $6,000,000 of bonds voted by the public.

The committee believes, however, that the right-of-way can be salvaged and the tunnels used for delivery of freight to industries in the central part of the city as well as in all the suburbs. The committee in its report also urged that immediate steps be taken to remedy traffic congestion, to extend trade and provide interurban railway inducements.

The report says:

> The construction of the subway has been in progress two years, but it is to be regretted that moneya were provided and work upon the same was begun and carried on without proper study and careful investigation of the city's actual needs.

In a statement made in connection with the report Frederick Garber said the loop was not feasible for rapid transit purposes because there is no way of operating it profitably and because if it were operated it would serve only a section of the community.

The committee also suggests the use of the tunnel as a means of bringing interurban cars into the city in place of its proposed use as a means of rapid transit.

Alfred Bettman, chairman of the City Planning Commission, said that the report made public by the subcommittee was unauthorized and that he would investigate the matter thoroughly before making any statement.

Work has been going on on the rapid transit project for the past two years and three of the six sections have been built.

Twenty Per Cent Wage Reduction on Short Line

The Railroad Labor Board has reported to Rufus C. Jones, comptroller of the Electric Short Line Railway, Minneapolis, Minn., commonly known as the Luce Line, a decision for a reduction of 20 per cent in the wages of the engineers, motormen, firemen, conductors and brakemen of that system. The board has had the matter under consideration ten weeks. The matter was referred to that body on Aug. 2 with the consent of the employees. The board took into consideration the financial condition of the carrier. The earnings had been falling below cost of operation, and the road was paying only 75 per cent of the union scale. The decision will be acceptable to the employees it developed in conference.

The new scale in cents per hour is as follows:

> In passenger service—conductors, engineers and motormen, 62½ cents; firemen, 57½ cents, and brakemen, 56½ cents.
>
> In freight service—conductors and engineers, 65 6/10 cents; firemen and brakemen, 59 4/10 cents.
>
> In switching service—conductors and engineers, 62½ cents; firemen and brakemen, 57½ cents.

Daily Guaranty Assured Extra Trainmen

One of the points considered at length in the finding in the Connecticut Company's wage arbitration proceeding, noted in the ELECTRIC RAILWAY JOURNAL for Oct. 22, was the matter of pay for extra motormen. The men contended for a daily guaranty of $3 instead of the present weekly guaranty of $21 and said that the present scheme was faulty in that a man who failed to attend two roll calls in the course of a week might be deprived of the unearned portion of his guaranty for the entire week.

On this point Counsel Vahey, who represented the men, and Justice Beach said:

> We recognize the importance to the company of some provision for effectively requiring the presence of the extra men when they are wanted, and we think the company and the public will be sufficiently protected for the balance of the year by establishing the daily guaranty with the proviso that for not more than ten weeks on each of its divisions during the balance of the year the company may on giving two days' notice to the division committee men put into effect the weekly guaranty instead of the daily guaranty.
>
> If any controversy arises as to the interpretation or effect of this award it is to be referred back to the chairman for decision, which shall be binding on both sides.

The recent wage award brought out some interesting facts on wage scales of previous years.

In June, 1914, a maximum rate of 28½ cents an hour was agreed on. In 1916 this rate was increased by agreement to 32 cents. In 1918 it was increased to 40 cents, effective May 31, 1919. During the year 1918 the cost of living continued to rise, and in November the men applied for and the company voluntarily granted an increase of 5 cents an hour, on condition that the increased rate of 45 cents should be continued until June, 1920. This was agreed to but in August, 1920, the men again applied for and the company again voluntarily granted a second increase of 5 cents an hour, making the maximum rate 50 cents. In June, 1920, the maximum rate for the blue uniform men was by agreement raised to 60 cents an hour for the ensuing year, and at the same time the length of the graduated scale was reduced from five years to two, so that the blue uniform men recently reached the maximum rate at the beginning of their third year.

Improvements in Southern California to Cost $1,079,143

Since May, 1921, the Pacific Electric Railway, Los Angeles, Cal., has undertaken a large program of improvement work on its system, the greater portion of which became necessary principally through franchise and legal obligation. The estimated cost of all the improvements outlined is $1,079,143. The following is the schedule of the improvement jobs now underway:

Highland Avenue: 5,523 lin, ft. of double track reconstructed with 4-15/16 in. 75-lb. C. S. revised rail with tie plates, Redwood ties, rock ballast and paved with 5-in. oil macadam pavement.

West Sixteenth Street: 3,669 lin. ft. of double track reconstructed with 7-in.-128 lb. grooved girder rail—treated ties—rock ballast and paved with 6-in. concrete base and 2 in. asphalt wearing surface.

Echo Park Avenue: 6,283 lin. ft. of double track reconstructed with 4-15/16-in.-75 lb. C. S. revised rail rock ballast—Redwood ties—paved with 5 in. of oil macadam pavement.

West Sixth Street: 400 ft. of double track and 1,600 ft. of double track combination gage track. Present 60-lb. ASCE and 6-in.-72 lb. tee rail replaced with 7-in. 128-lb. grooved girder rail—reballasted with rock ballast—Redwood ties renewed with treated ties—repaved with 6-in. concrete base and 2-in. asphalt wearing surface pavement.

Santa Monica Boulevard, Colegrove Line: 11,978 lin. ft. of double track—reconstructed with 4-15/16-in. 75 lb. C. S. revised rail—rock ballast—grade change—Redwood ties—paved with 5-in. of oil macadam pavement.

San Bernardino-Mount Vernon Avenue, Colton-San Bernardino Line: 3,000 lin. ft. of single track reconstructed with 4-15/16 in.-75 lb. C. S. revised rail—rock ballast—Redwood ties—paved with 5 in. of oil macadam pavement.

Los Angeles, Eighth Street Freight Terminal: Constructed 4,600 lin.ft. of additional freight handling and storage tracks—constructed new freight terminal layout, by utilizing the brick-constructed carpenter, blacksmith and paint shop buildings formerly used by company shops before new Torrance shops were put in operation. Altering these structures and constructing additions thereto to provide enlarged and more modern freight terminal layout, as present freight terminal does not meet the company's rapid development of its freight business. New outbound freight station to be 390 ft. long; 50 ft. wide and platform full length of structure, width of platform 8 ft. New inbound freight station to be 420 ft. long; 67 ft. wide. Exclusive of these structures will be constructed an unloading rack for independently handling newspaper print.

Los Cerritos Stations-Long Beach Line: Retire 1,000 lin. ft. of present double track, pile trestle bridge spanning the Los Angeles River and construct 1,100 ft. of new double track pile trestle bridge and place seven 60-ft. skew girders. (420 ft.). Raise bridge 4 ft. above present grade. Raise approaches to new bridge each end approximately 4 ft. Provide riprap for protection of approximately 1,200 ft. of embankment. This work brought about by U. S. government constructing new flood control levee each side of company's structure for purpose of defining the channel of Los Angeles River, with ultimate purpose of preventing the river during flood periods from silting up the Los Angeles Harbor, at which point the river has during past flood periods left its course and damaged the harbor.

Another Municipal Line Opened

Clairmount-Owen Section of Detroit Municipal Railway Placed in Service—New Section Reached

Preparatory to starting service over the Clairmount-Owen crosstown line of the Detroit (Mich.) United Railway cars of the one-man safety type were started over the line on Oct. 22 to familiarize the operators with the line with a view to starting the regular five-minute schedule during the rush hour and ten-minute service the rest of the day, beginning on Monday. If it is found that a more frequent service is required, it is planned to put on more cars as needed.

While the Clairmount line passes through the residential section of the northwest part of the city, which has not had car service, it is not expected that the line will return a profit over operating expenses until such time as the day-to-day lines are taken over so that the Clairmount-Owen cars can be operated over extensions both on the east and west side of the city. This line will be connected with the present Epworth Boulevard line and the Grand Belt line of the Detroit United Railway, both of which are to be taken over by the city according to arbitration.

A resolution has been passed by the City Council providing that the proposed amendment to the city charter to provide for trackless transportation be again placed on the ballot for the coming November election. The amendment if passed, will empower the Street Railway Commission to acquire and operate gasoline motor buses, trackless trolley buses or such other type of trackless transportation as is deemed desirable. On Oct. 11 the amendment failed to receive a 60 per cent majority, 35,515 votes being cast in favor of and 24,693 votes against it.

Mayor Couzens and the Street Railway Commission are anxious to have the amendment receive a 60 per cent majority vote before proceeding to purchase trolley buses or similar equipment, although it was the opinion of some of the city officials that a simple majority vote was all that was required to provide for the purchase and operation of such equipment. It was the belief of the Mayor that the proposed amendment was not thoroughly understood prior to the October ballot and that many voters opposed it believing that it necessitated the appropriation of money other than that already provided for by the original $15,000,000 bond issue approved in 1920.

Trolley Bus Rapped by Peter Witt

Peter Witt, Cleveland, is in Seattle, where he has been engaged by the City Council to study Seattle's transportation problem. In a speech to the Council, Mr. Witt said he did not favor operation of city owned railways with the aid of taxes; that there is "nothing to the trackless trolley"; that the "one-man car has got to come," and that motor transportation "will never supplant the street railway."

Mr. Witt, said that any rate of fare which produces more revenue but does so from fewer riders is a mistake.

In referring to the use of taxation funds to support street railways, Mr. Witt said:

> That principle is economically unsound. It takes the management as well as the operatives of the system off their mettle.

He explained in detail his approved zone system of fares.

The coming of Mr. Witt to Seattle was strongly opposed by Mayor Hugh M. Caldwell, who asserted that Mr. Witt's engagement had been made by the Council without his being consulted. He even wired Mr. Witt stating that he had not approved of the investigation, and suggesting that Mr. Witt remain in Cleveland until an ordinance has been passed authorizing his employment and appropriating money for his services. The matter had been approved by the Council, however, and an ordinance appropriating $8,400 to pay for his services has been referred to the finance and utilities committee.

An Appeal Made for Unemployed in Columbus

The correspondence between the Columbus (Ohio) Chamber of Commerce and the Columbus Railway, Power & Light Company with respect to the unemployment situation in Columbus has been printed in the form of a full-page advertisement in the Columbus *Citizen*.

The Chamber of Commerce has appealed to the railway officials to start in motion its share of the improvement work on Main and Front Streets and if not actually able to initiate the work to procure the necessary materials so that some progress can be made in the late autumn. In making its request the Chamber of Commerce expresses its appreciation for the work already done by the railway.

The railway, through C. L. Kurtz, its president, commends the patriotic work of the Chamber of Commerce and other service organizations in their efforts to relieve the unemployment problem but states its inability to advance improvement plans when no funds are available for that purpose. The company gives a detailed account of the recent accomplishments of the railway, which is one of the largest employers of labor in Columbus.

Bus Proposal Accepted

Saginaw Council Favors Terms of Bus Company—Chamber of Commerce Is Opposed

If the Council can finance the advanced sale of transportation amounting to $125,000, the city of Saginaw, Mich., will, according to the proposal of the Wolverine Transit Company, Detroit, have motor coach transportation. At the regular meeting of the Council on the evening of Oct. 25 its proposal was accepted with some minor changes and to hurry matters, for Saginaw has not had any reliable transportation facilities since the Saginaw-Bay City Railway ceased operating its cars on Aug. 10.

MAYOR INTRODUCED ORDINANCE

The ordinance giving the company the right to operate was introduced by Mayor Mercer, who also introduced the proper notice revoking the franchise of the Saginaw-Bay City Railway. Commissioner George Phoenix, who has fought the traction company right along, refused to vote for the revocation of the franchise and the approval of the motor coach plan.

The Council issues an appeal to the board of commerce, clubs and societies to assist in selling the advanced transportation and within a day or two a decision on the matter is expected from the board of commerce. That body refused several weeks ago to entertain the proposal as then made by the bus interests in the name of the Wolverine Transit Company.

The essentials of the offer of the Wolverine Transit Company follow:

It will place in operation within ninety days thirty-five motor coaches each with a seating capacity of twenty-five. The rate of fare is 6 cents with universal transfers. In order to finance the plan the company proposes that the city arrange to sell in advance $125,000 of tickets, in books of 200 with a face value of $12, at a cost of $10. The money from this source is to be retained by a trustee appointed by the Council, and as each bus is delivered the trustee is to pay at the rate of $4,150 to the manufacturer. The trustee is to have a first mortgage on the equipment to the amount of the advanced transportation until the tickets sold in advance have been used.

The company is to deposit with the bus manufacturer $115,000 as a guarantee to it to start manufacturing and delivering the buses. The company further agrees to deposit with some local bank, $30,000 for operating expenses during the time the tickets are being used. The Council is to govern the service. Insurance will be carried on all buses to the amount of $5,000 for one passenger and $25,000 for one accident.

In order to insure service, the mortgage to be given the city's trustee is to run for one year, after which the company will furnish a $100,000 bond for continuation of service. The company does not ask a franchise, or the elimination of the jitneys, asserting the service which it will give will compel the jitney operators to retire from business.

There is to be a special election on Dec. 7, called to submit a bond issue to complete the water plant, and at that time, the jitney owners ask that their proposal, which the Council rejected, be submitted. Commissioner Phoenix is circulating petitions for municipal ownership of buses and it is possible that this question too will be submitted.

Residents of Miami Must Decide

Miami (Fla.) voters will decide on Nov. 1 if they want to buy the defunct Miami Traction Company's track, franchise and rolling stock for $50,000 cash and a "bad account due" of approximately $73,000, which it is claimed the system owes the city for paving and bridge liens. The city is to vote on issuing bonds for $100,000, half of which will be paid the Tatum interests for the assets of the system. The liens are to be canceled. The other $50,000—if the city votes the issue—will be used to equip the 5 miles of the system with poles and trolley wire so that the lines may run as trolley lines instead of on storage batteries as previously.

Since the fire which destroyed the company's powerhouse and carhouse more than a year ago the line has not resumed operation. Many suggestions and propositions for operating the line have been offered from time to time. A few months back the Miami Chamber of Commerce offered its assistance in securing a franchise for some operator who would undertake to provide the city with railway service.

The present plan is to lease the system under some arrangement to the Miami Beach Electric Company, which is operated by the Carl C. Fisher interests.

Ordinance Passed Forcing Presentation of Electrification Plans

Favorable action has been taken by the City Council of Buffalo, N. Y., on the ordinance proposed by Frank C. Perkins, the Socialist member of the board, for electrification of the steam railroad lines within the city limits. The ordinance provides that a plan must be submitted by the railroads by Feb. 1, 1922, and carried out one year later. The action of the Council was unanimous.

For years the municipal authorities have been discussing the advisability of enacting such an ordinance as it affects the New York Central belt line operating largely through the north park residential section, but representatives of the railroads always have contended that the cost would be too great. Some time ago a hearing was held on the proposed ordinance and railroad engineers said electrification of rail lines within the city would cost millions. The ordinance enacted by the Council forces the railroads to submit an electrification plan within the next four months.

News Notes

New York Subway's Seventeenth Anniversary.—Posters of the *Subway Sun* and *Elevated Express* are featuring the seventeenth anniversary of the opening of th New York subways by the Interborough Rapid Transit Company. The posters show former Mayor McClellan and other well-known men marching from the City Hall to board the first train on Oct. 27, 1904.

Action on Extensions Deferred.—The public utilities committee of the Board of Supervisors of San Francisco, Cal., met on Oct. 19 to discuss the municipal Railway extensions. The advantages and disadvantages of the several tunnel routes were gone over thoroughly. Final action on the matter was put over for two weeks. It is more than likely that if the various improvement associations fail to agree on the extensions the Board of Supervisors will take the matter in its own hands and arbitrarily make decisions. The plans for this improvement have been referred to in detail previously in this paper.

American Legion Convention in Kansas City.—A special issue of the *Railwayan*, the monthly "organization magazine" of the Kansas City Railways, will be published in honor of the convention of the American Legion, in Kansas City, Oct. 31, Nov. 1 and 2. This issue will contain more than 200 pictures of army and battlefront scenes and portraits of members of the railway organization who had been in service. The company has slightly more than 3,000 employees, and among them are 1,500 ex-service men, said to be the largest percentage of former service men employed by any similar company of the size of the railway in the United States.

300 Veterans Meet.—The first annual banquet of the Veteran Employees' Club of the Twin City Rapid Transit Company employees in Minneapolis, St. Paul and suburbs was held on Oct. 11 at the Central Y. M. C. A. in Minneapolis. The "oldtimers" seemed to enjoy the get-together at which many "youngsters" listened to tales of the old horse car days. The occasion was just to "reminisce" and hear the story of railway development in those parts. Mike Donovan, who entered the service in 1875 and "worked under every management and master mechanic," was there and so also was "Hod" Carter of 1883 days. Horace Lowry, president of the Twin City Rapid Transit Company and son of the founder of the company, came to the gathering to commend his trainmen for their loyalty. He said: "With such support as we are given I don't see how any corporation could fail to succeed."

Financial and Corporate

Valuation Testimony Heard

$85,573,196 at Prevailing Prices Fixed As Reproduction Cost of United Railways, St. Louis

The taking of testimony by the Missouri Public Service Commission to determine the value of the property of the United Railways, St. Louis, Mo., took up Oct. 18, 19, 20 and 21 in St. Louis, with one witness on the stand. Hearings were then adjourned for a month to give the City Counselor and his associates time to study the figures submitted.

Counsel for Receiver Wells and the company submitted several sets of valuation figures as follows:

1.—Reproduction, based upon prevailing prices of material and labor, Jan. 1, 1920, $85,573,196, including depreciation.

2.—Replacement at prices prevailing June 30, 1921, $82,202,727, including depreciation.

3.—Replacement new if based upon average prices for a five-year period beginning June 30, 1916, and ending June 30, 1921, $70,201,102, including depreciation.

The inventory and exhibits submitted fill ten volumes of foolscap paper width and length, and include 4,500 pages of typewritten matter. W. B. Bennett, Madison, Wis., formerly engineer for the Wisconsin Railroad Commission, and now an associate of F. W. Doolittle, New York, in charge of the valuation work for the company, was the only witness during the four days. He is to be cross examined later. The commission sought to shorten the hearing and cut out much oral testimony, but counsel for the receiver and the corporation objected on the ground that they wanted the record to be complete in case the decision of the commission was such as to force the case into the courts for review.

James L. Harrop, engineer for the Missouri Public Service Commission, who appraised the property of the company, fixed the value at $48,936.805, in his report last spring. His estimate was based on average prices of labor and material for thirteen years between 1906 and 1918. That cost depreciated to represent physical condition of the property was $34,285,531. His figures were on the "investment" plan.

Neither the railway's nor Mr. Harrop's figures include any intangibles—allowances for consolidation, or as a going concern, etc. These items are to be added by the commission.

Taking Mr. Harrop's own figures, the railways submitted a fourth valuation of $66,867,486, which is an extension of the inventory brought up to date. The railways' "investment cost" figures were only $1,527,767 higher than Mr. Harrop's on the same inventory, complete.

In making the opening statement to the Commission, Thomas Elmer Francis, of the receiver's counsel, appealed for a liberal valuation on the ground that capital would not be attracted for sorely needed improvements and extension, and future rapid transit, unless the present security holders were treated fairly. He was cut short by the commission, which decided that arguments would be heard after all the testimony is in. Mr. Francis gave details of increased operating costs since 1916 and asserted that the universal transfer system had saved the car riders $7,784,000 in 1920 alone and more than $75,000,000 since the consolidation in 1900.

The outstanding securities of the corporation, now in receivership, exceed $100,000,000. Two years ago the city and the company agreed to a tentative valuation of $60,000,000. This was changed later by the commission to $50,000,000 for rate making purposes. The present fare of 7 cents is to run until Jan. 1, 1922, when it was supposed that the new valuation would be decided. A decision, however, is not expected in that time now and an extension may be granted. The latest report shows that revenue is hardly sufficient to pay 6 per cent on the $50,000,000.

City Counselor Caulfield stated the city would contend that the value of all United Railways property for rate-making purposes was not more than $45,000,000. It is expected that he will challenge the company to show that more than $25,000,000 had been invested by the stockholders. The other $20,000,000, he said, was "contributed by the public." He did not reveal the source of his figures.

Mr. Caulfield told the commission the burden is upon the company to show that it is entitled to charge more than 5 cents, the contract fare as fixed by the city charter. He declared: "If it fails to move the commission, whose aid is invoked to relieve it from its contract, the citizens will get a 5-cent fare."

In reply Mr. Francis said:

> I must utter a note of warning. My distinguished opponent (Caulfield) is pursuing a course that, like a boomerang, will return to smite those whom he represents. You cannot harm this company without inflicting injury upon the public which it serves. Any increase in taxes, any burden imposed upon it that increases its expenses or decreases its revenue; any action that will prevent or retard the flow of new capital to its treasury, is bound to affect its ability to give proper service.

The hearings are not expected to be resumed before the last of November.

Railway Line Not Profitable.—It is reported that the property of the St. John's Electric Company, the local operating railway in St. Augustine, Fla., has been offered to the city as a gift.

Electric Purchase Approved

California Commission Authorized Western Pacific to Purchase Sacramento Northern Railroad

The State Railroad Commission of California on Oct. 18 authorized the Western Pacific Railroad to purchase the Sacramento Northern (Electric) Railroad including all its properties, rights and franchises. Under the terms of the sale the Western Pacific is to pay $730,000 in cash for the physical property and to assume the payment of the outstanding bonds of the company. On the basis of the present market value of Western Pacific bonds given in exchange for the bonds of the Sacramento Northern the total purchase price is $4,450,000. This includes the $730,000 cash payment and the expense entailed in the exchange of bonds.

The Western Pacific Railroad Corporation, parent company of the Western Pacific Railroad, had already acquired more than 97 per cent of the outstanding stock and more than 98 per cent of the outstanding bonds of the Sacramento Northern. The bonds were acquired by the exchange of Western Pacific bonds for the bonds of the Sacramento Northern at the exchange basis of $80 Western Pacific bonds to $100 Sacramento Northern bonds. The stock of the Sacramento Northern was obtained at the rate of $27.50 per share for the first preferred stock, $15 per share for second preferred and $6 for common.

This stock control placed the Western Pacific Railroad Corporation in control of the Sacramento Northern and the directors of the Sacramento Northern voted for the sale of the property to the Western Pacific.

Of the outstanding stock of the Sacramento Northern $136,800 par value and of the outstanding bonds $80,094 have not been deposited under the Western Pacific offer. Additional time has been granted in which to make deposits.

The Western Pacific is to acquire the Sacramento Northern through a subsidiary company known as the Sacramento Northern Railway capitalized for $1,000.000. It was necessary to form a subsidiary company, it was pointed out, because under the Western Pacific mortgage it cannot advance any money to a company of which it does not own the entire capital stock. The Western Pacific Company, by the terms of the Railroad Commission's decision of Oct. 18, is authorized to use $4,450,000 of the proceeds obtained from the bond issue previously authorized; to acquire the stock of the Sacramento Northern Railway, the new subsidiary ern Railroad. The Sacramento Northern Railway is authorized to use $730,000 from the proceeds obtained from the sale of its stock to acquire the properties of the Sacramento Northern Railroad. The remainder of the proceeds are to be used as working capital.

Reorganization Ordinance Prepared

The city attorneys of Pittsburgh, Pa., have prepared an ordinance for presentation to Council authorizing the city to enter into the agreement with the Philadelphia Company and Pittsburgh Railways looking toward the reorganization of the Pittsburgh Railways. This agreement was drawn up by the city attorneys and counsel for the Philadelphia Company.

George N. Munro, Jr., special city counsel in charge of public utility legislation, said that while he was anxious to have the measure introduced at once and thus open the door for discussion on the proposition and an early decision, it would probably be held up another week. This delay, he said, was due to the fact that counsel for the Philadelphia Company, now absent from the city, has not had an opportunity to approve or reject a proposed amendment to the agreement.

The amendment as proposed by Mr. Monro provides that the new company shall assume full liability for the payment of all damage claims against the old company. Since the railway was placed in the hands of receivers many persons have been awarded damages in the local courts. These claims, according to Mr. Monro, now amount to $600,000.

He proposes to have the new company pay the claims in ten instalments, allowing ten years in which to pay off the debt. Lawyers representing a majority of those who were awarded damages have agreed to this proposition, Mr. Monro said. The proposed amendment is the only change which will be made in the agreement before it is considered by Council.

Many pamphlets containing a copy of the agreement on reorganization were mailed to various boards of trade and other civic organizations throughout the city, with the request that they study the proposition and offer criticism and suggestions, only a few have sent replies to Council. A majority of them approved the agreement, some with reservations, but each requested a public hearing before final action is taken by Council.

The terms of the agreement for the reorganization as proposed to be executed by the city and the railway were reviewed in the ELECTRIC RAILWAY JOURNAL for July 30, page 180.

Status of Security Holders Fixed

Judge Mayer in the United States District Court has handed down an opinion in the suit of the Westinghouse Electric & Manufacturing Company against the Brooklyn (N. Y.) Rapid Transit Company, defining the status of the lien of the Brooklyn Rapid Transit gold 5s of 1945, as a first lien in equity upon the property acquired with the proceeds of $2,125,000 of the bonds, and upon property acquired with later proceeds amounting to $889,705, and such property acquired by the Brooklyn Rapid Transit Company as is subject to the lien of the first and refunding mortgage dated July 1, 1902. The opinion was confined solely to the question of the priority liens as between the trustees of the two mortgages. The 1945 mortgage was made in 1895 to secure an issue of $7,000,000 of 5 per cent gold bonds and 1902 mortgage to secure an authorized issue of $100,000 000 gold 4s.

Daily Receipts Up $1,050

Despite Industrial Depression Connecticut Company Is Doing Much Better Than a Year Ago

President L. S. Storrs and the federal trustees of the Connecticut Company met on Oct. 23 with the Public Utilities Commission in Hartford and discussed the financial condition of the company. Coming after three consecutive hearings before the commission on petitions for a reduction in fares, it is believed that a formal statement from the Connecticut Company as to its attitude on rates will be made in the immediate future.

The federal trustees will meet in New Haven on Oct. 29 and it is expected that they will take a "positive attitude" on the fare situation as recommended by President Storrs in his memorandum now before the Public Utilities Commission. The company is now making some money and it is in a better financial condition than during the last two years, as was shown in President Storrs' statement to the trustees.

FARE CHANGES UNLIKELY BEFORE SPRING

Indications are that fare reductions will get more serious consideration next spring than this winter because of the uncertainties of winter weather and their effect on railway transportation.

Twenty or more buses on various lines are being continued in operation by the Connecticut Company at a daily loss of $150. The Public Utilities Commission was informed of this fact by W. J. Flickinger, assistant to President L. S. Storrs, during the hearings for lower fare rates. Mr. Flickinger said:

> We are running these lines only for the service they afford, not for revenue. Our experience has gone far enough to show us that bus operation costs more than trolleys because much rolling stock is required.

According to him, under present maintenance costs, buses would have to be operated at full capacity throughout the day at a 5-cent fare in order to make expenses. He said it cost $20 a day to operate a trolley-owned bus.

The financial statement of the company as made by Mr. Storrs covers the first seven months of each year from 1916 to 1921 and shows that the operating revenue in those periods increased more than $3,000,000 since 1916 and that the operating expenses nearly doubled. Taxes have increased from over $260,000 to more than $400,000. The non-operating income has decreased from approximately $150,000 to a little over $5,000.

The following table shows the net income available for return on the capital invested in the first seven months of the past five years:

1916	$2,133,726
1917	1,653,573
1918	1,274 890
1919	1,042,625
1920 (deficit)	266,913
1921	1,352,917

In his statement to the trustees Mr. Storrs said:

> It seems to be desirable to take a positive attitude in the matter of our rates of fare in order to meet the feeling on the part of the most conservative of the public that the time has come for reduction.
>
> This is based upon the argument that the company was relieved by the last Legislature of the paving and bridge obligations, a lower rate of taxation was established and above all the competitive motor bus has been very generally eliminated. Furthermore, the general reductions in the price of coal and other commodities should have a corresponding effect upon our operating costs and an anticipated reduction in the rates of pay will have a marked effect upon our pay-roll costs.
>
> There is no question that the 10-cent rate of fare is considered abnormally high and it is all the more of a burden to a majority of the car riders due to the drastic reduction in industrial rates of pay and unemployment conditions.
>
> There is no question but that the people of the State generally recognized the need for the higher rate of fare when it was inaugurated and are still willing to pay that rate without much comment, but are expecting us to make some voluntary reduction.

Mr. Storrs points out that the decrease in car riders is marked, but he attributes this solely to industrial conditions. He points out that at the present time the daily receipts are averaging $1,050 a day more than they did during November, 1920. The increased revenue has been obtained in centers where the jitneys have only recently been restricted.

Mr. Storrs predicts the net revenue in November and December will be the same as last year. The cash balance of the company, he says, is better than it has been the past eighteen months. On Oct. 1 the company had a cash balance of $419,120, with all due accounts paid, while in 1920, the excess of accounts due over cash on hand was $365,000.

Municipal Lines Have a Theoretical Surplus

According to figures reported by the City Comptroller, the receipts of the Detroit (Mich.) Municipal Railway for the month of September amounted to $31,137 and in the same period of time operating expenses, not including interest on bonds, sinking fund or taxes, amounted to $26,313. To meet the charges for sinking fund, bond interest and taxes, money is being taken from the construction fund, and this action it is cited is justified by the ruling of the Interstate Commerce Commission that such charges are capital costs and may properly be charged to construction until the street railway system is complete.

The municipal street railway officials expect that the returns from the municipal lines will be greatly increased as soon as the so-called day-to-day lines are taken over by the city. These lines will connect with the municipal lines already in operation making a more complete system of north and south as well as cross-town lines.

A 5-cent fare is being collected on

all municipal lines, and according to the city charter a rate of fare must be charged sufficient to meet operating expenses, sinking fund and interest charges and taxes. If it is found that the present rate is not sufficient to meet all charges and return the money taken from the construction fund the fare will be raised.

$4,464,828 Deficit for Interborough Rapid Transit

The Interborough Rapid Transit Company, New York, N. Y., closed the fiscal year ended June 30, 1921, with a deficit of $4,464,828, as a result of combined operations on its subways and elevated lines. The deficit is the company's worst showing for any year, being nearly double the 1920 deficit of $2,235,836, and exceeding the deficit of $3,810,339 in 1919, the largest heretofore recorded. High labor costs and inflated commodity prices are given as the cause of the poor income statement of the company, which points to its contractual obligations calling for a 5-cent fare as compelling the company to render service to the public at less than cost.

During the year the total number of passengers carried was 1,013,678,831, a record. Recent months, however, have shown a falling off in gross revenue, indicating a check in the growth of passenger traffic.

Gross revenue for twelve months amounted to $55,031,941, an increase of $3,553,531 over the preceding year, while operating expenses totaling $36,024,646 showed an increase of $4,329,437.

An increase in amount of taxes assignable to operation of $112,284 in 1921 further lowered the company's operating income, which shrunk from $17,159,791 in 1920 to $16,271,601 in 1921. Total income deductions for the year amounted to $21,375,551 compared with $20,003,996 in 1920.

A comparative income statement of the Interborough Rapid Transit Company for the twelve months ended with June, 1921 and 1920:

Gross	$55.031,041	$51,478.411
Net after taxes....	16,271,601	17,159.791
Total Income	16,910,724	17,768,160
Deficit after charges.	4,464,826	2.235.837

The deficit of the charges is exclusive of deficit accruals under the provisions of Contract No. 3 and related certificates which under these agreements with the city are payable from future earnings. For twelve months to July 1, 1921, these accruals amounted to $11,016,654.

Railway Loses Money.—The operation of the Paducah (Ky.) Electric Company during the past twelve months has been at a loss, according to a report by Manager A. S. Nichols to the City Commissioners and Mayor. The report shows operating expenses to be $174,304 and gross earnings $171,338. Taxes were $7,948, leaving a shortage of $10,914.

Financial News Notes

Suit for Appointment of Receiver Refused.—Saul Zielonka, city solicitor of Cincinnati, Ohio, has refused the request of Robert S. Alcorn, attorney, that he bring suit for a receiver for the Cincinnati Traction Company and for $1,000,000 back franchise tax.

Long-Term Bonds Offered.—Edward B Smith & Company, Philadelphia, Pa., are offering $100,000 of the Philadelphia & Garrettford Street Railway's first mortgage 5 per cent gold bonds. The price is 77 and interest to yield 6.75 per cent. Due date is Aug. 1, 1955.

Must Resume Trolley Service.—The Mayor and City Commission of Manistee, Mich., have notified the Manistee Railway that unless service is restored within thirty days the franchise will be forfeited. Railway service in Manistee was suspended Sept. 1.

Another Indiana Company Surrenders Franchise.—The Terre Haute, Indianapolis & Eastern Traction Company has filed notice with the Indiana Public Service Commission of the surrender of all of its franchises in Indiana. There were some thirty franchises in all that will now be exchanged for the indeterminate permit of the Public Service Commission.

Claims Ordered to Be Filed.—The bond of R. W. Levering, receiver of the Lafayette (Ind.) Service Company, operating the railway system of Lafayette, was fixed at $5,000 following his appointment as receiver by Judge Anderson in Federal Court recently. Judge Anderson ordered that all claims against the company must be filed within ninety days. Mr. Levering was appointed receiver of the company on Oct. 18.

Wants Tracks Removed.—The San José (Cal.) Railroads has petitioned the State Railroad Commission for permission to remove its tracks on Keyes Street from Tenth to the end of the line. The company also requests the substitution of a single track instead of the double one on Tenth from Reed to Keyes Streets. Lack of patronage and the financial inability to meet paying expenses are advanced as the reasons for the removal.

Railway Must Pay Taxes.—By a decision of the State Supreme Court at Olympia, the Seattle Municipal Railway must pay taxes levied against it during the month of March, 1919, in which month the system was conveyed to the city by the Puget Sound Power & Light Company. Both the city and power company appealed from the judgment of the lower court, which held the taxes payable, and which refused to adjudicate the amounts payable as between the city and the company. The State Supreme Court affirms the lower court and holds that, in so far as the present action is concerned, there is nothing for the court to adjudicate.

Many Shares of Stock Bought.—The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., reports that since June 30 more than 1,500 men and women have bought shares of the 8 per cent preferred stock of the company. These shares were bought with cash or in monthly payments. The details of the campaign describing the offering of this stock locally were reviewed in the ELECTRIC RAILWAY JOURNAL, issue of July 16.

Bonds Extended.—Notice has been given to holders of the first consolidated (new first) mortgage bonds of the Minneapolis Street Railway, issued jointly with the Minneapolis, Lyndale & Minnetonka Railway, due Jan. 15, 1922, that these bonds have been extended to Jan. 15, 1925. Interest will be 7 per cent from Jan. 15, 1922, and it is said further that holders may extend their bonds bond for bond with the payment to them of $10 for each bond extended, the privilege being subject to cancellation without notice. The cash payment is to be made at the time of the delivery of the bonds with the extended coupon.

First and Refunding Bonds Offered.—A new issue of $16,000,000 of Philadelphia Company, first refunding and collateral trust mortgage 6 per cent gold bonds, series A, dated Feb. 1, 1919, and due Feb. 1, 1944, is being offered by a syndicate composed of Lee, Higginson & Company, Ladenburg, Thalmann & Company and Hayden Stone & Company. The bonds are offered at $87 and interest yielding about 7.18 per cent. The issue is secured by first mortgage (subject only to $300,000 bonds) on gas properties valued by independent engineers at more than $35,000,000 and by a first lien on securities valued at more than $21,000,000. The total valuation of properties and securities on which these bonds are a first lien is more than $56,000,000.

Briefs Ordered Filed in Depreciation Case.—No arguments were presented by either side at the preliminary hearing before the Interstate Commerce Commission in the matter of depreciation charges of the Washington Railway & Electric Company. The commission was satisfied with the presentation of an agreed statement of facts. The legal representatives of the Public Utilities Commission and of the Washington Railway & Electric Company were instructed to file their briefs within thirty days, after which a date will be set for oral argument. The railway contends that it is an interstate carrier and as such the Inter-State Commerce Commission would have jurisdiction over its depreciation charges. The commission contends that the railway is not an interstate carrier within the meaning of the transportation act.

Traffic and Transportation

Advance of Fare Case Urged

Supreme Court to Be Asked to Advance Proceeding Involving Right to Charge Seven Cents

The United States Court of Appeals at Cincinnati, Ohio, has certified three questions to the United States Supreme Court, in the appeal of the city of Louisville from the restraining injunction of Judge Walter Evans of the United States District Court at Louisville, preventing the city of Louisville from interfering with the Louisville Railway in charging a 7-cent fare. In this action the city held that the railway violated a contract, calling for a 5-cent fare, while the company contended that it had no contract. The Court of Appeals in June failed to reach a conclusion in the matter and in view of the number of questions involved decided to let the Supreme Court settle them.

It is understood that the city has already arranged to present a motion in the Supreme Court to advance the case to the spring docket.

The questions certified to the Supreme Court from the federal Court of Appeals were:

> 1. Did the act of 1856 have the effect of making revocable that immunity from rate regulation evidenced by the 5-cent contract which was purported by the charter and by the contract of April, 1864?
> 2. Did such immunity terminate with the end of the original charter term in 1894?
> 3. Did the acceptance by the company of the Constitution of 1891 have the effect of making revocable any such existing immunity?

Regarding the first question City Attorney Lawton said:

> The court for all practical purposes decides that the city and the company had been delegated the power by the Legislature in the '60s and '70s to enter into a rate contract and the city and company did enter into such a contract for a 5-cent fare. At that time there was in existence an act of the legislature of 1856 providing that all the charters and franchises shall be subject to amendment or repeal at the will of the legislature, provided, however, that no amendment or repeal shall impair vested rights.

Relative to the second question, Mr. Lawton said that the charter of the old company expired in 1894, but in 1886 the Legislature had extended it ninety-nine years. This involves the question of whether the extension also continued the rate contract made with the city.

The third question asks for interpretations of several sections of the Constitution, Mr. Lawton explained.

Mr. Barnes maintained that there was no contract existing at the time of the institution of the suit, and that, "assuming that there was a proposed contract, it seems that it would not be binding either on the city or the railway company."

Mr. Barnes' views on the second question were:

> The original charter of the railway was for thirty years, from 1864. It was extended in 1886. Did this extension secure to the railway the right to charge a fixed fare or did this immunity from change expire in 1894 and leave the right to the Legislature—by itself or through the city—to reduce the fare as might be equitable?

Mr. Barnes said in regard to the third question:

> If the Supreme Court comes to the conclusion that under the act of 1856 (1) there is no binding contract, or (2) that whatever might have been the result of the arrangement between the company and the city in 1864, this arrangement expired in 1894, or (3) that the arrangement as to fare became revocable by the adoption of the constitution in 1891 there is no existing contract and the railway company has the right to insist on a rate of fare that will not be confiscatory.

One-Half Fare for Children in District of Columbia

A bill has been introduced in the House of Representatives by Representative Dyer of Missouri making it mandatory for the street railways operating in the District of Columbia to charge one-half the regular rate of fare for children between the ages of six and twelve years. The bill provides that children under six years of age should be carried free when accompanied by an adult. The bill makes provision for half fare for all pupils, under eighteen years of age, of day or night institutions of learning.

The measure provides that these tickets shall be honored only at times when the school of which the passenger is a pupil is in session. The tickets are to be sold in lots of ten each, and are to be furnished only upon presentation of a certificate from the principal of the school.

The half-fare provisions in the bill carry with it the privilege of a universal transfer. The measure carries a penalty clause which assesses a forfeit of $25 for each offense.

New Five-Cent Fare Zones Established

Additional 5-cent fare zones will be started on the lines of the Boston (Mass.) Elevated Railway on Nov. 24. The routes scheduled are as follows:

Allston Railroad Bridge Allston to Porter Square, North Cambridge, via Central Square, Cambridge.

North Beacon Street, Market Street to Allston railroad bridge

Western Avenue, Watertown Arsenal and Central Square, Cambridge.

Market Street, Washington Street to Western Avenue.

Cottage Farm, Brookline Street, Central Square.

Pearl Street and Putnam Avenue to Central Square.

Harvard Square, Kendall Square line via Broadway.

Spring Hill, Kendall Square line.

Porter Square, Kendall Square via Broadway.

Sullivan Square, Central Square, Cambridge.

Harvard Square, Dudley Street line between Harvard Square and Charles River road, Cambridge.

Jeffries Point line between Harvard Square or Central Square and Charles River road, Cambridge

Beacon Street between reservoir and the Boston-Brookline line.

Relief Sought in Jacksonville

Railway There Merely Meeting Expenses on a Seven-Cent Fare—Company's Cards on Table

Relief from city assessments for paving and sewers, a higher fare or some relief for the company is the plea of the Jacksonville (Fla.) Traction Company, a Stone & Webster property, made before the City Council by Peter Q. Knight, Tampa, general counsel in Florida for Stone & Webster. It resulted in the appointment of a committee to meet with Receiver E. J. Triay to see if some agreeable and equitable solution cannot be reached.

Mr. Knight argued that the present fare, 7 cents, granted by the Railroad Commission of the State last year, has enabled the line to pay operating expenses only and that not a cent has been laid away to meet indebtedness of $1,000,000 hanging over the system when receivership was instituted.

There will be a city levy of $100,000 on the paving of Main Street, he told the Council, and he stated that the company could not meet it. It cannot borrow further, he said, because it is not paying its present indebtedness.

This system is paying a levy of 3 per cent of its gross revenues to the city under its franchise—a sort of franchise tax—and it is possible that some relief in this connection may be the avenue taken to solve the problem.

In discussing the matter later, Mr. Knight said to the representative of the ELECTRIC RAILWAY JOURNAL:

> We considered it the best plan to lay all our cards on the table. So we have done so. This is a matter which concerns all of the people of Jacksonville. Their representatives on the City Council will confer with the receiver for the traction company and they will find out just what the situation is. We would be glad indeed to be able to earn our way with a 7-cent fare, or a lesser fare, if it were possible.
>
> The fact is, the street railway business throughout the country is in a bad way and has been for years. Everything that enters in their operation has increased in price in recent years, and there are very few places where the people enjoy, as in Tampa, a 5-cent fare.
>
> In Pensacola the traction company is in a receivership and the fare there is 8 cents. In Miami the railway threw up the sponge about a year ago and has not operated a car since, and the city is now considering purchasing the property and operating it as St. Petersburg did with its traction line about two years ago At St. Augustine the owners of the railway recently offered virtually to give the city its property, if it would undertake to make the betterments which the city government there is insisting shall be made by the traction company.

"Two Bells" Will Contain Bulletins

Two Bells, the official publication of the Los Angeles (Cal.) Railway, will hereafter print bulletins which have heretofore been posted in division bulletin books. This change will enable the trainmen to read the notices at their leisure and therefore avoid the unnecessary crowding around the bulletin book. The bulletins will be effective on the day *Two Bells* is issued unless otherwise mentioned. Division superintendents keep a complete file of this booklet.

Permits for Jitney Operation Granted in Tacoma

The city of Tacoma has undertaken the regulation of jitneys operating on its streets, the applications for permits having shown a marked increase since their ousting from Seattle streets. The Council has granted a number of permits for jitneys, after they were recommended by Commissioner Fred Shoemaker, who passes upon all applications. The jitney routes avoid following street car lines as nearly as possible. Where the electric railway has not provided service, the city has given the jitneys full power to operate. Open hostilities between the platform men of the Tacoma Railway & Power Company and jitney drivers broke out following the granting by the City Council of a number of petitions to operate jitneys.

Bus Company Will Seek City Authorization

As a result of the recent ruling of the Attorney General that the Ultimate Bus Company, Wheeling, W. Va., comes under city and not state supervision the company will apply for a city permit. Counsel Beneke for the bus company recently made this statement. Since the ruling there has been no further development in the long struggle between the bus company and the Wheeling Traction Company, and the buses have been running unmolested. The State Railroad Commission had previously refused a permit to the line and had ordered it to cease operation. Following the order the ruling came that the city had jurisdiction in the case. The various moves in the case were reviewed in the ELECTRIC RAILWAY JOURNAL, issue of Oct. 8.

Seattle's Mayor for Private Buses

An ordinance providing for the purchase of motor buses for operation by the city of Seattle into the suburban districts, such as Cowen Park and South Beacon Hill, at a cost of $50,000 has been vetoed by Mayor Hugh M. Caldwell. The Mayor states that he can see no necessity for the city to invest such a sum in motor buses, when private interests stand ready with buses to continue the service that they have been giving for years.

Mayor Caldwell said:

> I have never favored the entire abolishing of jitney buses. I have advocated and still believe in regulated bus service. Putting the traveling public both ahead of the bondholders represented in the acquisition of the municipal railway, and ahead of persons who have operated jitneys without restriction, I feel that rapid transportation, properly regulated, should not be abolished until we have something to offer in place of it. . . . Personally, I favor the issuance of permits for through buses furnishing rapid transportation to those sections of the city not supplied by the car lines, and I will not while in office voluntarily agree to stifle the growth of the city by exterminating all other forms of transportation than that which can be accommodated upon the surface street railways, which are fast becoming antiquated and obsolete as a modern form of transportation.

Mayor Caldwell, however, approved a bill providing for exchange of transfers between city street cars and privately owned for-hire cars, acting as feeders to the municipal railway. He stated that he signed the bill because it was in the nature of an experiment by the Council to endeavor to afford relief to certain sections of the city that have been deprived of transportation, and that he did not wish to stand in the way of such experiment, although doubting its success.

The Mayor expresses the opinion that more money would come to the city by accepting the offer of the jitney men to pay $20 a month for every private jitney operated on the Cowen Park line than could be made on municipal buses.

Free Buses in Muncie

Thrifty suburban dwellers at Muncie, Ind., are riding to and from the business district without cost in jitneys that formerly charged them 5 cents. As a result of the war between the jitney owners and the Indiana Union Traction Company, the latter backed by an ordinance passed recently by the Council, all jitneys now carry the sign "Free."

While the buses pursue their accustomed routes over streets used by the street cars, the policemen, charged with the duty of keeping buses off these streets, appear rather perplexed. Apparently, if the jitney drivers do not charge for the use of their machines they are not violating the city ordinance, which says that these buses shall not be operated for hire in streets which have car service.

The truth is, of course, that the drivers are receiving money, for they accept contributions offered by those who ride in their cars. The law, apparently, does not cover this, and it also is rumored that one who fails to make a contribution is not "seen" by some of the drivers the next time one waits to be picked up.

Bus Regulatory Ordinance Passed

The Council of Columbus, Ohio, has passed the bus regulatory ordinance which has been pending for some time. The measure contains among other provisions the following:

> Bus companies must ask Council for franchises.
>
> Bus companies must pay the city an annual license fee of 1 cent per mile for each bus operated, payment to be in advance.
>
> Companies must deposit with city a surety bond of $25,000 or shall carry liability insurance of $5,000 for a single accident, $25,000 for an accident injuring one or more persons and $5,000 for an accident damaging property.
>
> Council reserves the right to map out bus routes and regulate fares.
>
> Buses cannot operate on streets where there are street cars except where designated by Council.
>
> No bus to be more than 86 in. wide.
>
> Buses must have suitable signal lights at night, be properly lighted at all times and heated when the temperature falls below 35.

Bus Company Wants Permit.—The Rochester Interurban Bus Line Company has applied to the Common Council for permission to operate buses to Perry, Conesus Lake, Livonia and Le Roy.

Another Bus Route Urged on Connecticut Company

Nathaniel J. Scott, manager Connecticut Company's Hartford lines, conferred recently with George A. Ray and others representing the municipal government, regarding the installation and routing of another bus line at Hartford. The proposed route is on Maple Avenue. It is generally understood that a favorable report will be made on the project to the Common Council. The action to be taken regarding the bus line on Maple Avenue is the result of the introduction in the court of Common Council by Alderman Ray of a resolution requesting the Connecticut Company to establish such a line before Jan. 1, 1922. The resolution was referred to the Common Council railway committee, and it is declared is favored by all of the members.

Will Consider Stage Line

A hearing will be held by the State Department of Public Works on the application for a certificate of necessity to operate a stage line between Seattle and Portland. The company, whose name has not been made public, plans to operate in competition with the railroads, and will pick up passengers at intermediate points. The trip by railroad at present requires about seven hours.

Interurban Hard Hit by Autos

Asserting that the inroads made by the bus lines operating between South Bend and Elkhart, via Mishawaka, and between South Bend and Niles, Mich., are such that the Chicago, South Bend & Northern Railway must increase fares or go bankrupt, Ralph Smith, general manager, appeared before the City Council recently with a plea for aid. The buses operate in South Bend on a schedule three minutes ahead of the interurban cars, and pick up passengers waiting for the electric trains. The Council has taken the matter under consideration. It is believed that the Council will pass an ordinance permitting the buses to enter the city for a stated license fee on streets which are not used by the railway.

Bus Service Extended

The Ritter Motor Bus Line is now operating routes between Bloomington and the following outlying towns: Atlanta, Farmer City, Colfax and El Paso. Two round trips are being made now daily between Bloomington and Atlanta. The Farmer City Line is an extension of the Leroy line. When the bus operated as far as Leroy three round trips were made daily, but with the Farmer City extension of 10 miles two round trips daily are being made. The line between Bloomington and Colfax has been especially profitable. So far none of the lines has competed with the lines of the Illinois Traction System, which extends west and south from Bloomington.

Rehearing Granted on Interurban Line Fare in City

The Public Service Commission has ordered a rehearing on its recent decision granting the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., a 10-cent fare without transfers within the city. No date has been set for the new hearing. The decision is regarded by the municipal authorities of Buffalo as the first step in the fight to upset the ruling of the commission, involving recent legislation giving the utilities board power to overthrow existing franchises between public service corporations and municipalities.

In its order the commission says it finds the city has just grounds for its application for a rehearing. Following the ruling of the commission giving a 10-cent fare without interchange of transfers with the International Railway, Buffalo, the Buffalo & Lake Erie Traction Company renewed its service within the city from the terminal at Lafayette Square and the Lackawanna city line. This service had been discontinued for some time.

Get Acquainted Movement in Springfield

The Springfield (Ill.) Consolidated Railway officials have advanced a little on the Aristotelian theory of "Know Thyself." Their philosophy is "Know Your Conductor and Motorman." Passengers will not have to study and analyze their moods, manners, etc., just to learn their names will do so that a courteous relationship will be established between the patrons of the line and the men who are responsible for the operation of the car. The company will placard the men's names and Springfield riders will soon be saying "Good morning, Jim" in answer to a conductor's cheery greeting.

Complaint Made Against Seven-Cent Fare

Once again the municipal authorities of Buffalo have opened a fight against the International Railway, operating the city traction lines. Upon recommendation of Frank C. Perkins, the Socialist member of the board, the City Council has passed a resolution directing William S. Rann, the corporation counsel, to draft a complaint to the Public Service Commission against the 7-cent fare. Commissioner Perkins advised the Council he was unable to obtain from the company or the commission a statement showing the increase in revenue obtained by the International through the boost in fare and the cut in wages of the company's employees. Restoration of the 5-cent fare with free transfers is sought by the city.

Complaint also will be filed by the city against what Commissioner Perkins calls "wretched service" now being given by the company. It is declared that railway service has been reduced 20 per cent by the company, and that more than 125 regular runs have been abolished and many of the extra trips during the rush hours have been curtailed.

Commissioner Perkins contends that about 150 cars lie idle in the six carhouses during the top peak of traffic and there are 260 fewer platform men employed than a year ago. It also is contended by the city that the installation of one-man safety cars on the Connecticut Street line results in a considerable saving to the company.

Ruling on Increased Rates Indefinitely Postponed

The North Carolina Corporation Commission instead of authorizing or refusing the increased rates of fare sought by the Carolina Power & Light Company, operating in Raleigh, and the Durham Public Service Company has indefinitely postponed the issuance of the order. The matter has been pending several months.

In Raleigh the fare is 7 cents and the company was seeking a 1-cent increase. In Durham the fare charged is 7 cents, but the petition called for a 10-cent rate.

There will be no change in the present schedule in these cities and no date has been set for the hearing on these petitions.

Pleasing the Public Spells Success

The Charlottesville & Albemarle Railway, Charlottesville, W. Va., is at it again. This property, under the direction of John L. Livers, is constantly up and doing, putting its business (transportation) before the public and actually selling it. The latest stunt is extending the hospitality of the line on certain days to the favored ones whom the company wishes to have as its guests.

Recently there was a state reunion of Confederate Veterans in Charlottesville and for the three days of the reunion the railway carried all the veterans free of charge. The invitation to ride on the lines of the Charlottesville & Albemarle Railway was extended through the daily newspapers which assured the men that their badge or uniforms would identify them. A large sign was carried on the front end of the cars which read "Welcome Veterans, Ride With Me."

Lending a Helping Hand

With school funds depleted and pupils facing the necessity of paying tuition in Dade County (Fla.), Manager Ellis of the Miami Beach Electric Company has addressed an offer to the Chamber of Commerce agreeing to carry school children free in Miami Beach provided the action would not interfere with the rules of the State Railroad Commission and the state laws governing utilities, which are very strict regarding "passes" and free transportation. The railway has been commended for its action.

Transportation News Notes

Barnes' Article Reprinted.—In the Oct. 15 issue of *Trolley Topics* the official publication of the Louisville (Ky.) Railway, extracts are reprinted from J. P. Barnes' article contributed to the Sept. 24 issue of the ELECTRIC RAILWAY JOURNAL. The article, "Relationship Between Management and Men — A Traffic Factor," has been a subject for comment in the papers in Louisville.

Applies for Rehearing.—The New York State Railways has applied to the Public Service Commission for a rehearing on its application for an 8-cent fare in Utica. The new application was made through Kernan & Kernan of Utica, counsel for the company. The story of the rejection of the former application for a 10-cent rate and the finding of the commission were reviewed at length in the ELECTRIC RAILWAY JOURNAL, issue of Sept. 24.

Cut in Fare Acceptable.—As the result of a petition before the Public Utilities Commission in which protest is made by the towns of Leicester and Auburn against the high rate of fare from the Worcester city line, the Worcester (Mass.) Consolidated Street Railway has made a cut of 4 cents. The adjustment now provides for a 10-cent rate from the city line to these towns. The Selectmen through their attorneys have accepted the proposal.

Buses Active in Ohio.—Since the Ohio Legislature last year passed a law placing motor buses under the same regulation as public utilities, bus lines are being started in nearly every section of the state. The books of the State Public Utilities Commission record that ninety lines have been registered and twenty more applications have been returned for technical corrections. It is estimated that this number is not more than half of the actual number of bus lines that are operating in the state.

Hearing Date Set.—Final date for the hearing of the city of St. Paul against the St. Paul (Minn.) City Railway on an order to show cause why it should not be restrained from putting in force the increase in fare from 6 cents to 7 cents has been set by Judge H. R. Brill of the Ramsey district court for Nov. 15. The city will not be ready before that date. A temporary restraining order was effective on Sept. 5 against putting in the 7-cent fare and four tickets for 25 cents as granted by the Minnesota Railroad & Warehouse Commission. The hearing on the Minneapolis Street Railway's emergency fare of 7 cents or four rides for 25 cents will probably not come up until the commission determines the permanent rate.

Legal Notes

ALABAMA—*Relative Rights on Street of Railway and House Mover.*

Use of a public street to move a building, requiring consent of the proper municipal authorities, also requires exercise of reasonable care so as not to interfere unreasonably with the public right, and such right so to use the street is subordinate to other lawful uses, as by a street railway, which is not under duty to remove obstructing posts or poles on demand of the mover of the building. Such poles, when erected under proper authority, are not *per se* nuisances. If a house mover is prevented from a reasonable use of the street by a railway he is entitled to recover the reasonable difference in the cost of removing the house in the manner in which he did have to remove it over what it would have cost to remove it but for the obstructions caused by the defendant. He cannot sit idle when he encounters an obstruction and recover for this lost time. [Birmingham Railway, Light & Power Co. vs. Ashworth (two cases), 86 Southern Rep., 82, 84.]

CALIFORNIA—*Railway Held Liable for Assault and Arrest by Guards Employed During Strike.*

Where a street railway, during a strike, employed guards, acting under instructions from the president, at points where attacks had been made upon the railway's employees and cars, the railway was liable for the acts of such guards who assaulted and arrested a pedestrian in the mistaken belief that he was one of the strikers and had participated in the attacks, such assault and arrest being within the scope of their authority, regardless of the mistake that was made. [195 Pacific Rep., 958.]

FEDERAL COURT—*Conditions Defined Where Franchise Has Expired.*

Where the franchise of a street railway company has expired, the city may require the company within a reasonable time to remove its tracks and other property from the streets without depriving the street railway of its property without due process of law. Day to day arrangements by which the continued operation of the railway is permitted do not give the company rights in the streets after the expiration of its franchise, though they do entitle the company to reasonable compensation while it is operating under the ordinance. The motive of the officers of the city and the electors in adopting an ordinance to construct a municipal railway are not the proper subjects of judicial inquiry, so long as the submission of the question to the people conforms to the requirements of the law. [Detroit United Railway vs. City of Detroit, 41 Supreme Court Rep., 285.]

ILLINOIS—*Company Liable for Injuries Reasonably to Have Been Anticipated from Overcrowding of Its Cars.*

Though it is not negligence as a matter of law for a street railway company to permit its cars to be overcrowded, it is bound to know the danger to passengers resulting from such crowding, and if it accepts too many passengers or runs cars so infrequently as to cause too many to seek to ride on each car, it is responsible for injuries which reasonably ought to have been anticipated. [Walsh vs. Chicago Rys. Co., 128 Northeastern Rep., 647.]

IOWA—*Settlement of Claim for Personal Injury Not Subject to Attack.*

Where a person, who had sustained a fracture of the leg on an electric car and had been assured by his physician that the bone had properly healed, accepted a lump settlement offered by the company, and there was nothing to show that the company was guilty of any fraud or bad faith, the injured person, when he finds the physician's diagnosis incorrect, cannot have the settlement set aside, since the purpose of such settlement is to avoid litigation. [Pahl vs. Tri-City Railway, 181 Northwestern Rep., 670.]

MISSOURI—*Husband's Negligence in Driving Not Imputable to Wife.*

Where a man and his wife went in an automobile to a depot to get their daughter, they were not engaged in a joint enterprise, and the husband's negligence in driving the car, if any, was not imputable to the wife so as to prevent recovery for negligence of operators of an interurban car at a street intersection. [Corn vs. Kansas City, C. C., & St. J. Ry., 228 Northwestern Rep., 78.]

NEW JERSEY—*Negligence Will Not Be Presumed.*

The body of a man with one arm and leg cut off was discovered about midnight on the tracks of a railway company. There was no eye witnesses to the accident. The court declared that negligence is a fact which must be proved and could not be presumed, so no damages were awarded. [McCombe vs. Public Service Railway, 112 Atlantic Rep., 255.]

NEW YORK—*Passenger May Be Arrested for Taking from a Railway Car a Package Left by Another Passenger.*

Where a passenger took with him from the car in which he was riding a package forgotten by another passenger and refused on demand to surrender it to the company's representatives, there was legal ground for his arrest and prosecution for petit larceny. A railway company is obligated to use reasonable and ordinary care and watchfulness to protect passenger's possession of his property while a passenger on its cars as against other passengers or persons. [Foulke vs. N. Y. Consolidated Ry. Co., 127 Northeastern Rep., 237.]

PENNSYLVANIA—*Slight Service Paid for by Pass Does Not Make Man an Employee.*

The employee of a power company, who in consideration of the receipt of an employee's pass from a railway company agreed to read a meter in the station of the power company and hand a record of this reading to a conductor, was not an employee of the railway under the meaning of the Workingmen's Compensation Act. Hence his remedy for damages for injury received while riding on the cars was that of any other passenger. [Strohl vs. Eastern Pennsylvania Railways, 113 Atlantic Rep., 62.]

RHODE ISLAND—*Last Clear Chance Doctrine Held Inapplicable in Automobile Collision.*

The doctrine of last clear chance was held without application in an action by the driver of an automobile struck by a street car when he crossed the tracks on a turn ahead of him. The motorman's duty to try to stop the car was considered not to arise until the plaintiff driver's peril was apparent. [King vs. R. I. Co., 110 Atlantic Rep., 623.]

UTAH—*Reserved Power of State to Fix Fare Can Be Exercised Despite City Ordinance.*

As power to fix street railway fares has been retained to the state by the public utilities act, such power can be exercised by it whenever the necessity requires, despite an ordinance of a city granting the railway the right to operate over a street. Such action does not impair the obligation of the contract. [Murray City vs. Utah Light & Traction Co., 191 Pacific Rep., 421.]

VIRGINIA—*Carriers Are Not Required to Coerce Passengers Into the Exercise of Ordinary Care.*

A carrier must exercise the highest degree of care for the protection and safety of its passengers but is not required to coerce passengers who are adults and mentally competent into exercising ordinary care for their own safety, as by not alighting from the baggage door of a combination passenger and baggage car. [Davidson vs. Washington & O. D. Railway, 105 Southeastern Rep., 669.]

WASHINGTON—*Possibility of Automobile Motor Stalling Should Have Been Foreseen by Motorman of Electric Car.*

An automobile driver, who started to cross the track when the electric car was 100 ft. distant, and who would have had ample time to make the crossing if his automobile had not unexpectedly skidded, causing him to stall the engine while the machine was on the track, was held not to be negligent as matter of law. The motorman should have kept his car under such control as to have stopped it in the event of such an occurrence as stalling of motor of the automobile. [Brennan vs. Tacoma Ry. & Power Co., 191 Pacific Rep., 813.]

Personal Mention

Mr. Hasbrouck of New York Service Commission Joins Accounting Firm

H. C. Hasbrouck, for many years with the Public Service Commission of New York as head of the accounting and statistical department, has resigned, effective Oct. 31, to become associated with H. C. Hopson, New York, consultant in utility rate and accounting matters. Mr. Hasbrouck is a native of Troy, N. Y. He received his early education in the public schools of that city. After his graduation from Cornell University, where he specialized in economics, history and political and social science, he served for a time as assistant to the Cornell University registrar. In July, 1908, he left that position for an appointment as junior statistician with the then only recently organized Public Service Commission for the Second District, and has been with that body in various capacities ever since.

In 1913 he was put in charge of the commission's division of statistics and accounts and continued to perform the duties of that position until the reorganization of the Public Service Commissions in July of the current year. When the two commissions were consolidated, Mr. Hasbrouck became deputy chief accountant of the commission, in immediate charge of the accounting and statistical work of the Albany office, through which most matters relating to finances and accounts of the up-state companies have been handled. Since July 1 he has, therefore, had supervision over most of the work previously done by the division of capitalization and the division of statistics and accounts of the up-state commission.

Mr. Hasbrouck is known to public utility interests outside of New York State by reason of his membership for several years on the committee of statistics and accounts of public utilities of the National Association of Railway and Utilities Commissioners. He was chairman of the special committee of three which prepared the original draft of the uniform systems of accounts for electrical and gas companies which the 1920 committee presented to the National Association at its annual convention last year with the recommendation that they be made the basis for uniform accounting requirements in all states.

Edward Kelleher has been appointed by Governor Edwards to the position of assistant secretary of the New Jersey Board of Public Utility Commissioners. The office is a new one. Mr. Kelleher will look after the operation of jitneys throughout the state and will have an office in Newark. Regulation of jitneys came within the jurisdiction of the commission by a law pressed several months ago. Mr. Kelleher was formerly connected with the federal revenue office in Camden.

Mr. Jackson Elected

Chairman of Wisconsin Body Will Direct Activities of Utility Commissioners

Carl D. Jackson was elected president of the National Association of Railway and Utility Commissioners at Atlanta, Ga., Oct. 12. James A. Perry of the Georgia Railroad Commission is the retiring president.

CARL D. JACKSON

Although the Railroad Commission of Wisconsin is not so old as some of the other commissions, having been organized in 1905, it has done much original work under the chairmanship of Mr. Jackson and Halford Erickson, whom he succeeded. This work has been widely studied and followed in many details by other commissions. In railroad affairs the commission's study of the costs of railway movements was the first made in this country. In the public utility field similar studies have been made, notably on rates and forms of schedules. One of the special features of the Wisconsin form of regulation is the indeterminate permit, which does away with the indeterminate franchise. Elsewhere in this issue is an article which completely describes the duties, methods and procedure of the Wisconsin Commission.

Mr. Jackson has been chairman of the Wisconsin Railroad Commission since 1916 and has for an equal time been active in the affairs of the national association. In 1919 he was elected second vice-president and in 1920 first vice-president. He has served on numerous committees, and as chairman of the committee on state and federal legislation in 1920 he did much noteworthy work. During the past year he has served as chairman of the executive committee.

Mr. Jackson was born at Evanston, Ill., in 1870 and was graduated from Harvard in 1894. Following graduation he practiced law continuously in Wisconsin until his election to the commission in February, 1915.

Mr. Atwood Made Head of B. R. T. Employees

William W. Atwood has been appointed president of the Brooklyn Rapid Transit Employees Benefit Association to succeed the late George W. Edwards. Mr. Atwood will succeed Mr. Edwards as secretary of the B. R. T. Board of Pensions.

Mr. Atwood is a practical railroad man and has been connected with the Brooklyn Rapid Transit organization in positions of responsibility for 18 years. He entered the Brooklyn Rapid Transit Company on Sept. 1, 1903, as trainmaster in charge of the eastern division of the elevated system.

Mr. Atwood continued in charge of the eastern division of the elevated lines until April 1, 1910, when he was transferred to the main office and appointed supervisor of the record branch, transportation department. He continued in charge of the record branch until he was selected to fill the vacancy in the office of president of the Employees Benefit Association, caused by Mr. Edwards' death on July 31.

Robert Ridgway, chief engineer of the New York Transit Commission, has recently returned from a tour of London, Paris, Berlin and other European cities, where he studied transit conditions and means used to meet them. Mr. Ridgway said that while the rapid transit lines of European cities are trying to obtain higher fares they are not stopping with that, but are making efforts to meet the situation by increasing the number of car riders.

Martin Schreiber, chief engineer of the Public Service Railway, Newark, N. J., and manager of the Southern Division of the company with offices at Camden, was recently appointed by Mayor Ellis of Camden a member of the Camden Development Plant Commission. This body consists of three members of the city council, the city engineer and three citizen engineers approved by the chamber of commerce. Mr. Schreiber was appointed as one of the latter. The commission will work out proper plans for the ultimate development of Camden, including those for city streets, transportation parks and playgrounds, zoning, and the like. One of the first things the Commission will do no doubt, will be to arrange for proper approaches and gateways through the city for the entrance to the bridge. Mr. Schreiber has a large amount of experience in this kind of work and was for two years, the chairman of the Development Plan Board of Engineers of Jersey City.

Obituary

J. Fithian Tatem, treasurer and general manager of the Five Mile Beach Electric Railway, Wildwood, N. J., died recently at his home in Haddonfield, N. J., at the age of fifty-two. Mr. Tatem was also vice-president of the Marine Trust Company, Wildwood, N. J., and solicitor and director of the Ocean City (N. J.) Title & Trust Company.

W. E. Mandelick, for many years secretary of the London Underground Electric Railways Company, Ltd., died last week. Mr. Mandelick went to London from New York about 20 years ago, at the time when Charles T. Yerkes of Chicago was in control of the property. Previously Mr. Mandelick had been connected with the Sprague Electric Railway & Motor Company and the Sprague Electric Company of New York. He had been in failing health for a number of years.

Younger Alexander, fifty-two years old, electric railway builder, financier, oil magnate and one of Lexington's, Ky., most prominent citizens, died recently. He promoted the Central Kentucky Traction Company, which built interurban lines to Georgetown and Paris, and for more than ten years was president of the Phoenix-Third National Bank in Lexington, which position he resigned five years ago to develope extensive oil interests in Eastern Kentucky.

B. E. Parker, aged fifty-three, for a number of years superintendent of the Marion division of the Union Traction Company of Indiana, Anderson, Ind., died Oct. 20. He was the first superintendent on the Marion division of the Union Traction Company and was advanced to this position from the Anderson City Railway. He resigned Jan. 1, 1911 to accept a position as general superintendent of the Rockford & Interurban Traction Company, Rockford, Ill., later holding positions at Evansville, Ind., and Akron, Ohio.

H. E. Billau, for nearly thirty-five years a field representative of the Sherwin-Williams Company, Cleveland, Ohio, died on Sept. 19 in Freemont, Ohio. Mr. Billau was exceptionally well known in steam railroad and street railway circles and was recognized everywhere as an authority on paints, particularly on railway paints and railway painting. Many of the car painting systems now in use in railroad and street railway car shops were originated and installed by him. For the past several years Mr. Billau's work has been concentrated largely in Cleveland, Detroit, Toledo, St. Louis, Chicago and other central cities. Loyalty to his friends, his customers and his company were dominant features of Mr. Billau's career.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Steel Rail Price Cut $7

U. S. Steel Corporation Announces a Reduction to $40 a Ton

The United States Steel Corporation on Oct. 22 announced a reduction of $7 a ton in the price of standard steel rails. The cut is from $47 to $40 a ton, according to an official statement issued by Elbert H. Gary, chairman of the board of directors. This is the first change in the price of rails put into effect by the corporation since the United States Industrial Board established a price of $47 on March 21, 1919. The Industrial Board price was a reduction of $10 a ton from the quotation prevailing at the time of the signing of the armistice, which price was established during government control of the industry. The official statement issued by Mr. Gary follows:

"We have decided to recommend that our subsidiary companies reduce the selling price of standard rails to $40 per ton base, f. o. b. our mills. The present costs of production do not justify this action, but it is hoped and expected that reductions in freight rates and otherwise, together with large operations, will soon have a beneficial effect upon our costs."

An inquiry made this week among the manufacturers of girder rails indicates that there has been no change in the price of girder rails corresponding to that just announced for standard rails.

The announcement came as a complete surprise. There has been talk at various times in the last year that rails might be reduced, but steel men always have scouted the suggestion, pointing to the extremely high cost of production. In fact it has been hinted from time to time that there might even be an increase in the schedule for rails. As a result, the rail price has remained unchanged, through three or four successive reductions in the entire industry of other products.

Among the independent mills there has been a disposition to sell rails at less than $47 a ton, but so far as is known no firm schedule which shows a price under that mark for the product has ever been made up by any of those producers. In some cases, it is understood, rails have even been sold for less than the new price announced by the United States Steel Corporation.

The new $40 price, it is understood, will apply to openhearth rails and the schedule for Bessemer rails probably will be fixed at $38 a ton, the customary spread between the two types. It represents the second reduction from the high mark of $55 to $57 for Bessemer and openhearth established during the war, the first cut amounting to $10 a ton.

It is believed that the independent producers of steel rails will make a public announcement of a corresponding reduction soon, notwithstanding that they have been making concessions in the immediate past which just about correspond to the new corporation price. It is beieved also that the new price may stimulate rail buying to a marked degree. Railroads throughout the country are sorely in need of new rails, but buying has been almost at a standstill because of the sustained price. The drop of $7 a ton, it is expected, will bring into the market a large tonnage which has been withheld for just such a contingency.

The normal rail requirements of the electric railways of the country are approximately 100,000 tons annually, so that the railroads as a result of the reduction will benefit to the extent of approximately $700,000 on next year's supply of rails.

Purchases Below Normal

The carriers, however, have not been buying their normal supply of rails, because of their financial position and partly because of the price. As a result they are understood to be far in arrears of having a normal supply on hand, and many more rails will have to be replaced next year than in a normal year, because of the economies which have been practiced of late. Consequently rail purchases in 1922 are expected to be above normal.

The Steel Corporation adhered to the prices fixed by the Industrial Board throughout the steel boom of the latter part of 1919 and greater part of 1920, and as a result its price for standard rails during this period has never been changed from the $47 level. Independent companies, however, had increased their prices, and as a result of their advances the average price of steel rails for 1920 was $52.64 a ton as compared with $47.50 in 1919 and $57 in 1918. The average prices for the last few years compare as follows:

1921	*$40.00	1917	$38.00
1920	52.64	1916	32.75
1919	47.50	1915	28.00
1918	57.00	1914	28.00

* New price.

The average price of steel rails from 1902 to 1915 was $28 a ton and in 1901 the average was $27.40.

Last to Be Adjusted

Steel rails were the last of the important steel products to succumb to the adjustment which the steel industry has experienced since the Fall of last year. All of the important products including plates, wire nails, beams, bars, tin plate, billets and pig iron have been sharply reduced from the prices which prevailed previous to the falling off in the demand for steel, but even in the face of the reductions in all of these products steel rails held their own.

Strike Would Bring Coal Shortage in a Week

Hasty surveys of the state of coal stocks reveal that supplies are sufficient to weather a brief railroad strike only. With the mobile reserve of coal suddenly frozen up, only a week would be necessary to bring about acute industrial suffering and physical suffering as well if it should happen to be cold. This is the opinion of one of the government's foremost coal specialists. It is pointed out that while the total coal in storage is reasonably large, its distribution is not such as to afford anything like the general relief that might be assumed from the total tonnage. Communities would be affected very unevenly if there were as much as a week's paralysis of transportation. Tidewater ports, lake ports and many railroads junction points would be congested with coal but the average inland city would suffer severely.

Among railroad officials there is a distinct current of optimism. They think the chances are very much against any strike. Even if the unions should do all they threaten, there is a feeling that if the men insist on striking this is the best possible time. The railroad management seems to be in an unusually favorable position.

Copper Demand Small with Price Weakening

Copper demand is small. While most producers are holding at 13 cents or better a tendency is appearing to cut prices somewhat on nearer deliveries and to extend the period over which 13⅛-cent copper will be sold. While home consumption continues fairly good, domestic buyers seem to prefer to await results of railroad negotiations before making further commitments.

Price of electrolytic copper is 12¾ to 12⅞ cents a pound delivered for prompt shipments, 12⅞ cents for November, 13 cents for December, and 13⅛ to 13¼ cents for first-quarter, 1922, deliveries. Price of Lake copper is 13 to 13¼ cents delivered for prompt and November delivery.

Proposed Elevated Electric Railway in Osaka, Japan

The Osaka Hanshin Kyuko Electric Railway Company, which operates a railway between Osaka and Kobe, according to *Electrical Industries*, is planning to construct an elevated electric railway between Osaka and Juso, and also to double the present lines, at a cost of about 3,000,000 yen. The company also contemplates building an underground railway from its Kobe terminus to Motomachi, to cost approximately 7,500,000 yen.

Rolling Stock

Baltimore (Md.) Transit Company is asking for bids on ten motor buses similar to those described elsewhere in this issue.

New Orleans (La.) Railway & Light Company, recently placed an order with the Nichols-Lintern Company, Cleveland, Ohio, for 200 mechanical sanders.

Georgia Railway & Power Company, Atlanta, Ga., has just placed an order with the Nichols-Lintern Company, Cleveland, Ohio, for 176 mechanical sanders.

Rockland (Ill.) City Traction Company contemplates purchasing eight buses at an aggregate cost of about $56,000. With these buses the company expects to furnish a service supplementary to that given by its railway lines.

Edwards Railway Motor Car Company, Sanford, N. C., has sold to the Atlantic & Western Railway, Sanford, one gasoline railway passenger motor car having a seating capacity of forty-six passengers and in addition baggage and mail space totaling 70 sq.ft.

Track and Roadway

Hull (Que.) Electric Company will relay a half mile of track on Main Street, Aylmer.

Hamilton (Ont.) Street Railway has been requested by the City Council to lay new tracks on King Street West, Aberdeen Avenue, Wentworth and Margaret Streets.

Berkshire (Mass.) Street Railway has begun its repair work on Ashland Street, North Adams. The work includes the laying of some new rails and steel ties between Chestnut and Porter Streets.

York, Ont.—It was announced at a recent meeting of the Township Council that the Government would be asked to move the tracks of the Toronto Suburban Railway through Mount Dennis to the center of the road so that the Township can pave the Weston Road from the city of Toronto to Weston.

Pittsburgh (Pa.) Railways will open up its Mignonette Steel loop East End, on Oct. 26. The loop, which cost $40,000, will be the route of cars now looping over Center and Highland Avenues. It will relieve the present congestion at Penn and Highland Avenues.

Lima, Peru. The original concession for an electric railroad from Lima to La Punta was for a double track railroad, but a recent modification now provides for only 11 kilometers of single track at this time from Lima to the village of Bella Vista which must be put into use within eighteen months from the date of the contract. The prolongation to La Punta and double tracking of the line must thereupon be completed within a time of approximately two years.

Miami Beach (Fla.) Electric Company may extend its lines right to the beach instead of stopping in the residence section of the beach property. Three routes have been proposed and are under consideration, to extend the line to Biscayne Avenue from First Street, thence along Biscayne Avenue to its end. Another proposed route was to extend the line over Collins Avenue to Biscayne Avenue to Ocean drive and First Street, passing all the casinos in this vicinity. The third plan was to open South Alton road and carry the line to Biscayne Avenue over South Alton road and then east to Collins Avenue.

Trade Notes

William J. Delaney, for many years connected with the Erie works of the General Electric Company has recently been appointed sales manager of the Cincinnati Car Company, Cincinnati, Ohio.

Ralph R. Rugheimer has been appointed representative of the Automatic Reclosing Circuit Breaker Company of Columbus, Ohio, in charge of the eastern Kentucky, Virginia and southeastern Ohio territory.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., is planning to establish a new branch at Huntington, W. Va., to supply the demands of its patrons in the states of West Virginia, Ohio, Kentucky and Tennessee. This branch will occupy a three-story building, 100 ft. square, located at the corner of Ninth Street and Second Avenue.

Blaw-Knox Company, Pittsburgh, Pa., manufacturer of steel produces, has announced the addition to its staff of H. O. Davidson. Mr. Davidson will have entire charge of the Prudential Sectional Building Department of the Blaw-Knox Company, and will be also general manager of the C. D. Pruden plant of the Blaw-Knox Company. Mr. Davidson will be located at the C. D. Pruden plant at Baltimore. Mr. Davidson was connected for eight years with the Hydraulic Steelcraft Company, being general manager of that organization at the time he severed his connections to become a member of the Blaw-Knox staff.

Insulation & Specialty Corporation of America, Wilmington, Del., was organized on Sept. 1 with a capital stock of $500,000 for the manufacture of an insulating material which will be sold under the name of "Fibre Granite." This material will be manufactured in sheets from .005 in. up to 12 in. in thickness and it will also be available in the form of tubes and rods which will be made in lengths from 40 to 60 in. and in diameters from ⅛ to 12 in. On Oct. 1 the capital stock of the company was increased to $1,000,000. P. C. Hennig is president and chairman of the board of directors.

Quigley Furnace Specialties Company, 26 Cortlandt Street, New York, has announced that its pulverized fuel department has been acquired by the Hardinge Company, 120 Broadway, New York. The Hardinge Company states there will be no change in the method of conducting the business at their offices, as the organization of the engineering department has been taken over practically intact. The experience and manufacturing facilities of the Hardinge Company enables them, with their present equipment and augmented staff, to further extend the activities of the Quigley pulverized fuel system.

Nic LeGrand, one of the best known and respected salesmen in the electric railway field, has hung out a shingle for himself. With headquarters and manufacturing plant at 1615 Third Avenue, Rock Island, Ill., he will supply various malleable, brass or aluminum foundry and machine shop products required by electric railways for trucks and miscellaneous car parts. He will also engage in the conversion of old single and double-truck cars for one-man operation, furnishing the material required or contracting to do the entire reconstruction work. Mr. LeGrand has been associated with the electric railway field for many years through long sales connection with the St. Louis Car Company and more recently with the National Safety Car & Equipment Company. Besides establishing his reputation as a salesman, he has won the confidence of a host of customers and friends. It is now his ambition so to conduct his own business that this personal confidence in him may be extended with increased measure to the dealings with him as a principal. Undoubtedly, the quality and price of his products will reflect the principles of square dealing which account for his success.

New Advertising Literature

E & B Manufacturing Company, Detroit, has recently brought out a "snap" connector for flexible cable.

Model Specialty Company, New York, has placed a small portable bench-drilling machine on the market.

Brown & Pengilly, Los Angeles, Cal., are marketing an overload relay "Merco" designed for the protection of alternating-current motors.

Ingersoll-Rand Company, New York, has recently developed a new motor-driven air compressor known as the "Imperial Type XCB."

Russell & Stoll Company, 17 Vandewater Street, New York City, has developed a new type of cable support for long vertical runs.

National Electric Corporation, Whitman, Mass., has developed the "Barnes Universal" tree insulator, designed to protect high-voltage distribution wires.

Hobart Brothers Company, Troy, Ohio, has just put on the market a new automatic motor-driven air-compressor pump and tank, equipped with magnetic pressure release.

Rapid Transit — Safe Transit

The huge subway cars of the New York Municipal Railway, each of which usually carries well over a hundred passengers, annihilating space at fifty miles an hour, are equipped with every kind of emergency safety device. These include—

PEACOCK
Improved Brakes

Specified by Engineers

It is no mere coincidence that Peacock Brakes are almost always found on rolling stock which has been designed under the independent direction of technical and engineering experts.

Such men do not specify brakes on guess work or some one else's say-so; they figure the braking forces necessary to stop a car from maximum speed in the shortest possible distance — in other words the maximum braking force which the wheels will take without skidding. Then they specify brake equipment which is designed to accomplish this result.

That means the Peacock Brake.

Peacock Improved 12-52

The 12-52 Gear ratio Peacock hand brake is the one with ample braking power for the heaviest city, interurban and rapid transit cars.

There is a proper size and type of Peacock Brake for every type of car and class of service.

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REPORTS FOR FINANCING COVERING
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More revenue from *more* riders
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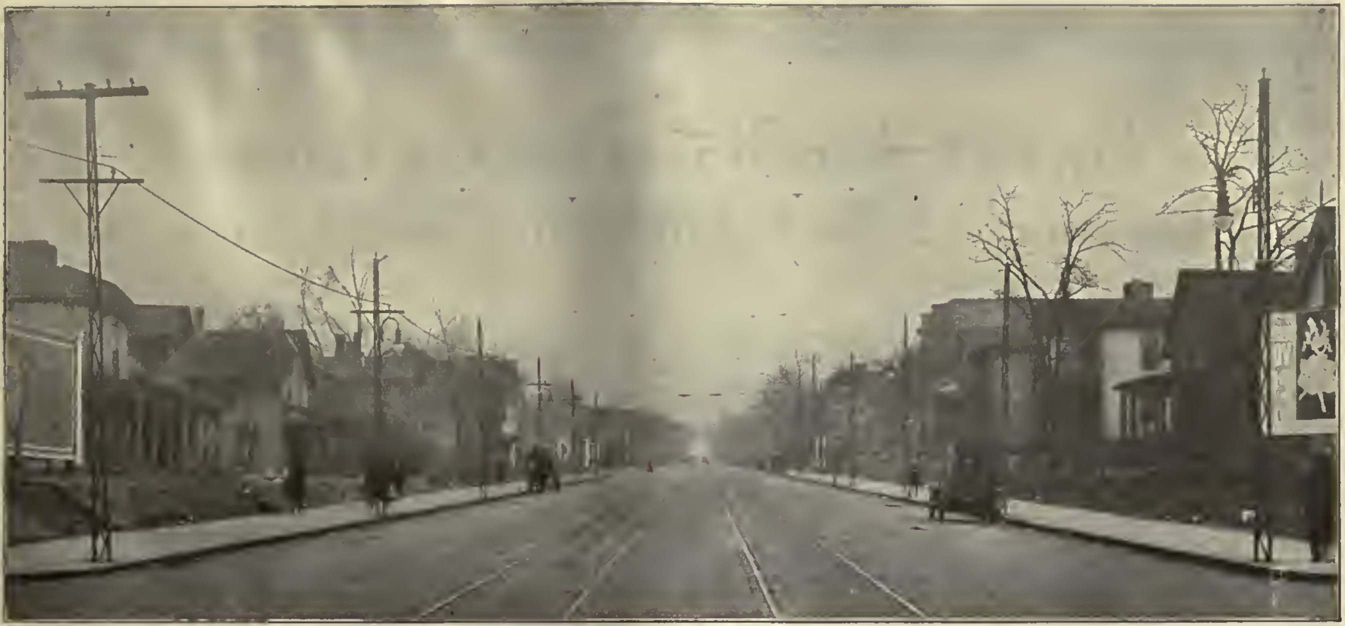

Bates One-Piece Steel Poles with Ornamental Lighting

This installation illustrates one of the possibilities of combining Artistic Bates Poles with ornamental lighting units.

The excessive number of poles required where trolley conductors and lighting units are installed on separate poles is not only decidedly inartistic, but is also a needless waste of good material. Of course, it is necessary that an artistic steel pole be used for such a combination of purposes.

The series lighting conductor is run from pole top to pole top eliminating the use of expensive, troublesome underground cable.

The use of Bates Permanent Steel Poles with ornamental lights represents maximum economy and the utmost in art.

Bates Expanded Steel Truss Co.

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CHICAGO, ILLINOIS

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Harold A. Hegeman, Vice Pres. and Treas. Fred C. J. Dell, Secretary

National Railway Appliance Co.

50 East 42nd St., New York City

Hegeman-Castle Corporation
343 So. Dearborn St., Chicago, Ill.

National Railway Appliance Co.
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Feasible Drop Brake Staffs
Flaxlinum Insulation
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Johnson Fare Boxes
Drew Line Material and Railway Specialties
Perry Side Bearings
Hartman Centering Center Plates
Economy Power Saving Meter
H & W Electric Heaters
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Pitt Sanders
National Safety Car Equipment Co's One-Man Safety Cars
Reversible Sliding Trolley Shoes

—a manufacturer

in Newark, N. J.

—saved $200

buying from an Indiana dealer in

—second-hand machinery

through his advertising in the

—searchlight section

It pays to read the Searchlight.

It pays to advertise in the Searchlight.

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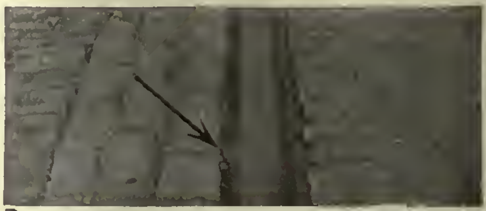
When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

Factors Which Govern the Proper Selection of Rail Joints in Paved Streets

Typical loose condition of pavement as result of cupped mechanical joint. Track which does not sell transportation!



Thermit Insert Weld installed in street joint and pavement troubles eliminated.

(2)—The Track Department as a Factor in the Sale of Transportation

A well-known Engineer Maintenance of Way states in a recent issue of the *Electric Railway Journal*:

"It is doubtful if many maintenance engineers look upon themselves as sales engineers for transportation, yet all their endeavors to keep their tracks in good condition have a bearing on the receipts of the company, for a smooth-running, easy-riding track offers an inducement to ride—it sells transportation. All the efforts of the maintenance-of-way men, therefore, are directed toward selling transportation, and every improvement in track conditions is a bid for riding. Make sales by making good tracks and maintaining good tracks and then go after production costs."

The THERMIT INSERT RAIL WELD

is the star salesman for paved track because by absolutely eliminating the rail joint during the life of the rail the Thermit weld offers the highest inducement for riding and entirely obviates complaints of bad track or pavement caused by loosening and pounding of the joint.

Let us know the section number of the rail which you wish to weld so that we can ship welding material suitable for the purpose. On receipt of an order for material and apparatus, we will send an expert demonstrator to instruct your men so that you can carry on this work yourselves.

Send for our latest Rail Welding Pamphlet 3932.

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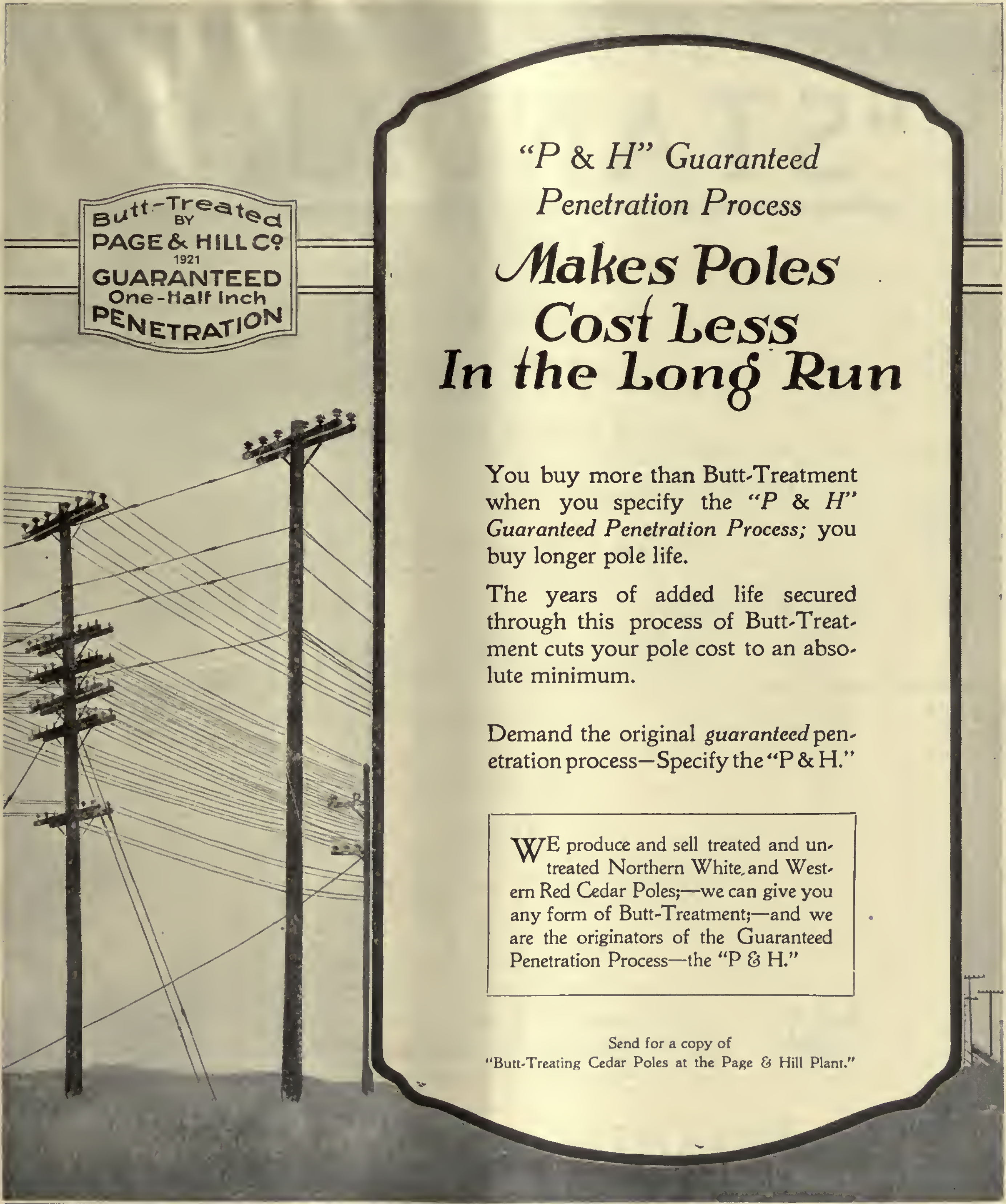

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Penetration Process

Makes Poles Cost Less In the Long Run

You buy more than Butt-Treatment when you specify the *"P & H" Guaranteed Penetration Process;* you buy longer pole life.

The years of added life secured through this process of Butt-Treatment cuts your pole cost to an absolute minimum.

Demand the original *guaranteed* penetration process—Specify the "P & H."

WE produce and sell treated and untreated Northern White and Western Red Cedar Poles;—we can give you any form of Butt-Treatment;—and we are the originators of the Guaranteed Penetration Process—the "P & H."

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Let us send you samples.

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Other Ry. Motor Gear M'f'rs.
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22 grades of gearing
each one "as good as Tool Steel"
BUT
Cincinnati "Tool Steel" is still
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Easy! This is the way some managers are securing one-man cars to keep abreast of the times. They forget that modern requirements demand something more than any old car which one man can operate—after a fashion. They are only temporizing with the march of progress.

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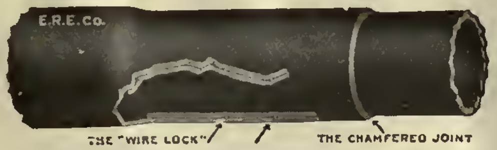

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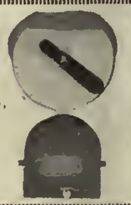
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Third Rail Insulators, Trolley Bases, Harps and Wheels, Bronze and Malleable Iron Frogs, Crossings, Section Insulators, Section Switches.
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Established 1877
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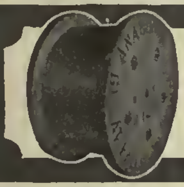
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Your best insurance against insulator breakage
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Makes permanent, light, level pavement with a minimum of paving repairs.
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Single-track block-signal protection
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High-Grade Track Work

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Manufacturers of
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Frogs, Crossings, Switches and Mates
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Of the well-known WHARTON Superior Designs and Constructions

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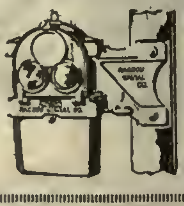

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is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.

Cameron Electrical Mfg. Co., Ansonia, Connecticut

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Electrical Machinery, Steam Turbines, Steam Engines, Condensers, Gas and Oil Engines, Air Compressors, Air-Brakes.

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— WRITE FOR BULLETINS —
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high-grade R. R. Track and Car Jacks.

The Buckeye Jack Mfg. Co.
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The fields of usefulness for Bakelite-Dilecto are many and varied because of its superior merit over materials heretofore available in sheets, tubes or rods. The exceptional qualities of Bakelite-Dilecto are satisfying electric railways all over the country. Investigate.

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J. H. WILLIAMS & CO.
"THE WRENCH PEOPLE"
Brooklyn · Buffalo · Chicago

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THE TERRY TURBINE
For Driving Your Auxiliaries
TERRY STEAM TURBINE CO.
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THE CUTTER ELECTRICAL AND MANUFACTURING CO.
CIRCUIT BREAKERS
I-T-E
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I. T. E.
Circuit Breakers
for heavy street railway work are the best obtainable. Write for New Complete Catalogue.

FOSTER SUPERHEATERS

A necessity for turbine protection, engine cylinder economy and utilization of superheat for all its benefits

POWER SPECIALTY COMPANY, 111 BROADWAY, NEW YORK
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ELECTRIC RAILWAY JOURNAL

Think "SEARCHLIGHT" First

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POSITIONS VACANT—Business Opportunities and other undisplayed ads. 8 cents a word, minimum $2.00 an insertion.

POSITIONS WANTED—Evening work wanted, tutoring and other undisplayed ads of individuals looking for employment, 4 cents a word, minimum 75 cents, payable in advance.

ADD 5 WORDS for box number in undisplayed ads if replies are to any of our offices. There is no extra charge for forwarding replies.

DISCOUNT OF 10% if one payment is made in advance for 4 consecutive insertions of undisplayed ad.

ADS IN DISPLAY TYPE—Space is sold by the inch (30 in. to a page), the price depending upon total space used within a year, some space to be used each issue.

RATE PER INCH for ads in display space:
1 to 3 in., $4.50 an in.
4 to 7 in., $4.30 an in.
8 to 14 in., $4.10 an in.
15 to 29 in., $3.90 an in.
30 to 49 in., $3.80 an in.
50 to 99 in., $3.70 an in.

POSITIONS VACANT

EMPLOYMENT

POSITIONS WANTED

POSITIONS VACANT

FIRST CLASS Foreman for Electric Railway Sub-Station operation and maintenance. Must be able to get results. Location—Central States. P-355, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

LIVE Foreman for Interurban Inspection and cleaning shop. Force of 5 or 6 men. Must know car equipment including H-L Westinghouse Control and Automatic Air. Location Central States. P-356, Elec. Ry. Journal, Leader-News Bldg., Cleveland, O.

POSITIONS WANTED

AUDITOR; 17 years with large railway properties; open for position; city or interurban lines. PW-357, Elec. Ry. Journ., Leader News Bldg., Cleveland, O.

ELECTRICAL engineer, graduate of University of Illinois; age 29. Has 4½ years of good experience electric railway maintenance and valuation of railway, gas, electric, water, ice and steam heat properties; good construction experience abroad. Present completing two year valuation large public utility. PW-352, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

GENERAL superintendent of operation of combined light, power, traction and gas property, desires change; competent to take charge of property either as manager or assistant manager; has made good record in charge of utilities operation and water power development; can furnish best of references; personal reasons for desiring change PW-350, Elec. Ry Journ., Old Colony Bldg., Chicago, Ill.

PURCHASING agent desires permanent connection with large institution in New York or vicinity. 14 years experience in automobile, railway, machinery, foundry and general manufacturing lines. Engineering University training, Married. Age 35, highest references. Available at once. Will consider reasonable offer if accompanied by opportunity for early advancement. PW-354, Elec. Ry. Journal.

SUPERINTENDENT of transportation with a proven record of 17 years with large city and interurban properties, desires a change. Very successful in dealing with public and labor and knows how to get results from employees. High grade references as to character and ability. Would prefer a good size city property. Relations with present employers are pleasant and satisfactory. Personal reasons for desiring a change. PW-351 Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

AGENTS AND SALESMEN

An Unusual Money Making Opportunity is offered salesmen now calling on the electrical trade or industrial plants; it will cost you nothing to investigate. Address 824 Monadnock Block, Chicago.

WE WANT

9—sets Brill 39-E Maximum

Traction Trucks

TRANSIT EQUIPMENT COMPANY
501 Fifth Ave., New York City

BOILER PLANT

We offer for sale all or part of a boiler plant consisting of twelve 1000 hp. Edge Moor Boilers built A.S.M.E. code for 200 lbs.—Foster Superheaters — Taylor Stokers — Diamond Soot Blowers—extra heavy piping—three 250 ft. x 16 ft. Self Supporting Steel Stacks—two 3000 hp. Cochrane Feed Water Heaters—complete with coal and ash handling machinery—used three to six months—subject to your inspection—a bargain.

ROY BRENHOLTS, *Trustee*
1015 Outlook Building, Columbus, Ohio

For 20 Years

we have been

Buying and Selling

Second-Hand Cars

Trucks and Motors

At Your Service

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa

The Searchlight Advertising in This Paper

is read by men whose success depends upon thorough knowledge of means to an end—whether it be the securing of a good second-hand piece of apparatus at a moderate price, or an expert employee.

The Best Proof

of this is the variety of this journal's Searchlight ads. Without a constant and appreciable demand for such machinery or services, by its readers, the market-place which these advertisements represent could not exist for any length of time.

Are you using the Searchlight Section?

0194

IMMEDIATE DELIVERY

2—1000-Kw. Westinghouse Synchronous Motor Generator Sets

Motor end—1400 kva. 2300/4000 volts, 80% P.F., 3 phase, 60 cycle, with direct connected exciter.

Generator end—1000 kw. interpole design, 600 volt, 1666 amp., speed 514 r.p.m.

2—300 kw. 25 cycle, 3 phase, ROTARY CONVERTERS 360 volts A.C. 600 volts, D.C., 500 r.p.m. with 15000/360 volt transformers. Will sell with or without the transformers. Can sell at very low price.

Outfits were built to operate continuously under 35 degree rise in temperature. Send for further details and prices.

ARCHER & BALDWIN, INC., 114 LIBERTY ST., NEW YORK CITY
Telephones 4337-4338 Rector

Street Cars For Sale

The Toronto Transportation Commission will receive tenders for the following 340 single-end city service street cars:

Group	Number	Description
A	4	18 ft. Single Truck Closed Motor Cars
B	2	20 ft. Single Truck Closed Motor Cars
C	15	21 ft. Single Truck Closed Motor Cars
D	117	22 ft. Single Truck Closed Motor Cars
E	30	23 ft. Single Truck Convertible Motor Cars
H	5	27 ft. Double Truck Convertible Motor Cars
J	1	30 ft. Double Truck Convertible MotorCars
K	12	25 ft. Double Truck Closed Motor Cars
L	34	30 ft. Double Truck Closed Motor Cars
Q	3	36 ft. Double Truck Closed Motor Cars
T	2	16 ft. Single Truck Closed Trailer Cars
U	33	19 ft. Single Truck Convert. Trailer Cars
V	69	22 ft. Single Truck Closed Trailer Cars
W	17	18 ft. Single Truck Closed Trailer Cars
	340	

The single-truck motor cars are mounted on Blackwell, Curtis and Peckham trucks and are equipped with G. E. 67 and G. E. 1,000 motors, K-10 controllers and hand brakes. The trailers are mounted on special trailer gear.

The double-truck motor cars are mounted on Curtis and Brill trucks and are equipped with G. E. 80, G. E. 67 and G. E. 1,000 motors, K-6 and K-10 controllers and Magann storage air brakes. A stock of spare equipment is carried for the above cars and will be disposed of to parties purchasing the cars. The wheel gauge of the cars is 4 ft. $10\frac{7}{8}$ in.

These cars are now in Toronto and can be inspected upon application to the Head Office of the Commission, Ryrie Building. Toronto, Ontario, Canada. Tenders will be based on the cars being loaded by the Comission on their siding in Toronto.

Tenders addressed to the Chairman, sealed and endorsed "Tenders for Street Cars" to be delivered at the Commission's Office, Room 219 Ryrie Building.

The highest or any tender will not necessarily be accepted.

Toronto Transportation Commission

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Purifiers
Horne Mfg. Co.

Anchors, Guy
Electric Service Sup. Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Armature Shop Tools
Elec. Service Supplies

Axles
Bemis Car Truck Co.
St. Louis Car Co.

Axles, Car Wheel
Bemis Car Truck Co.
Brill Co., The J. G.
Standard Steel Works Co.
Westinghouse E. & M. Co.

Axle Straighteners
Columbia M. W. & M. I. Co.

Babbitt Metal
Ajax Metal Co.
More-Jones Br. & Metal Co.

Babbitting Devices
Columbia M. W. & M. I. Co.

Badges and Buttons
Electric Service Sup. Co.
Internat'l Register Co., The

Bearings and Bearing Metals
Ajax Metal Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
General Electric Co.
More-Jones Br. & Metal Co.
St. Louis Car Co.
Westinghouse E. & M. Co.

Bearings, Center and Roller Side
Stucki Co., A.

Bells and Gongs
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.
St. Louis Car Co.

Benders, Rail
Niles-Bement-Pond Co.
Railway Track-work Co.

Bending Apparatus
Railway Track-work Co.

Boilers
Babcock & Wilcox Co.

Bond Testers
American Steel & Wire Co.
Rail Welding & Bonding Co.

Bonding Apparatus
American Steel & Wire Co.
Electric Ry. Improv. Co.
Electric Service Sup. Co.
Ohio Brass Co.
Rail Welding & Bonding Co.

Bonds, Rail
American Steel & Wire Co.
Copper Clad Steel Co.
Electric Ry. Improv. Co.
Electric Service Sup. Co.
General Electric Co.
Ohio Brass Co.
Railway Track-work Co.
Rail Welding & Bonding Co.
Westinghouse E. & M. Co.

Boring Tools, Car Wheel
Niles-Bement-Pond Co.

Boxes—Junction and Outlet
National Metal Molding Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, etc.)
Bates Exp. Steel & Tr. Co.
Electric Ry. Equip. Co.
Electric Service Sup. Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Hamilton & Hansell, Inc.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
Amer. Br. Shoe & Fdry. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Brakes, Brake Systems and Brake Parts
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
Horne Mfg. Co.
Johns-Manville, Inc.
National Brake Co.
St. Louis Car Co.
Safety Car Devices Co.
Westinghouse Tr. Br. Co.

Brooms, Track, Steel or Rattan
Amer. Rattan & Reed Mfg. Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
U. S. Graphite Co.
Westinghouse E. & M. Co.

Brush Holders
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.

Buses, Motor
Brill Co., The J. G.
Republic Truck Sales Corp.

Bushings
Nat'l Fibre & Insulation Co,
Nat'l Metal Molding Co.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.

Cables (See Wires and Cables)

Carbon Brushes (See Brushes, Carbon)

Car Lighting Fixtures
Elec. Service Supplies

Car Panel Safety Switches
Westinghouse E. & M. Co.

Cars, Dump
Differential Car Co.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
St. Louis Car Co.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
General Electric Co.

Castings, Brass, Composition or Copper
Ajax Metal Co.
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Br. & Metal Co.

Castings, Gray Iron and Steel
American Steel Foundries
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Standard Steel Works Co.
St. Louis Car Co

Castings, Malleable and Brass
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Catchers and Retrievers, Trolley
Electric Service Sup. Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Ceiling Car
Pantasote Co.

Change Carriers
Galef, J. L.

Circuit Breakers
Condit Elec'l. Mfg. Co.
Cutter Co.
General Electric Co.
Westinghouse E. & M Co.

Clamps and Connectors for Wires and Cables
Anderson Mfg. Co., A. & J. M.
Electric Ry. Equip. Co.
Electric Service Sup. Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Cleaners and Scrapers—Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Ohio Brass Co.

Cleats
Nat'l Metal Molding Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

Coil Banding and Winding Machines
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.

Coils, Armature and Field
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co
Westinghouse E. & M. Co.

Coils, Choke and Kicking
General Electric Co.
Westinghouse E. & M. Co.

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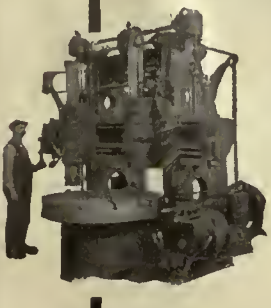

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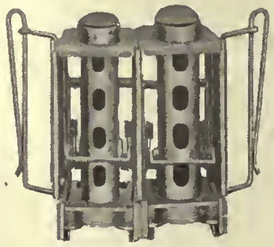

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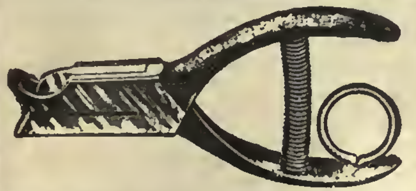

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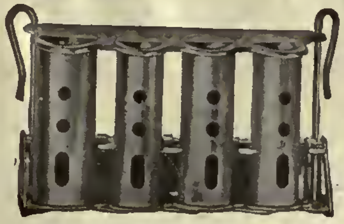

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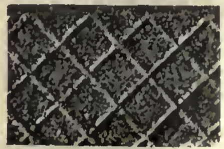

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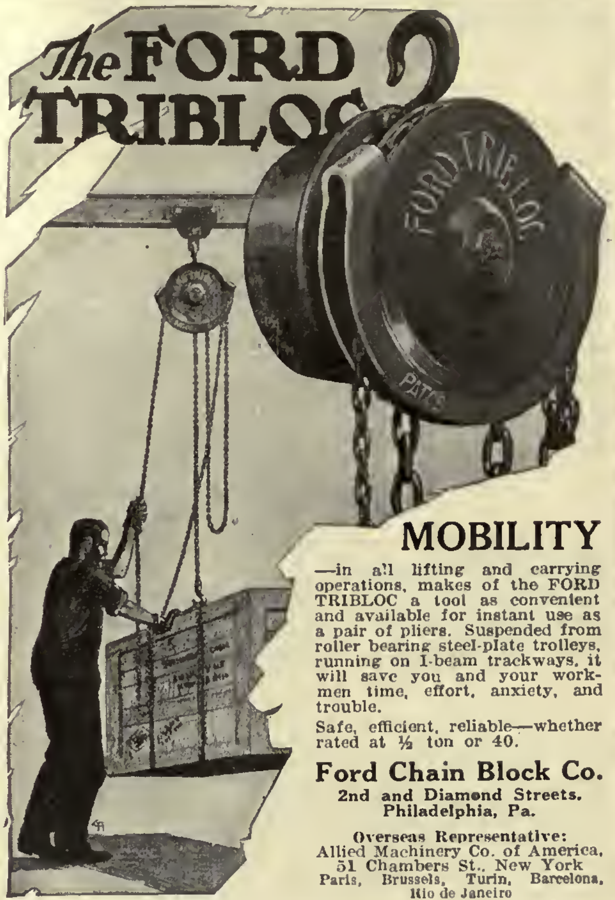

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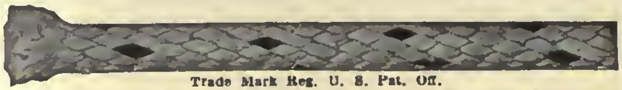

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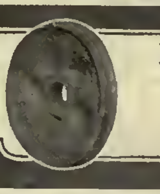

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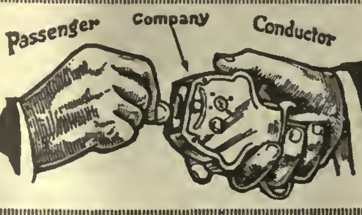

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How the strongest insulating base was developed

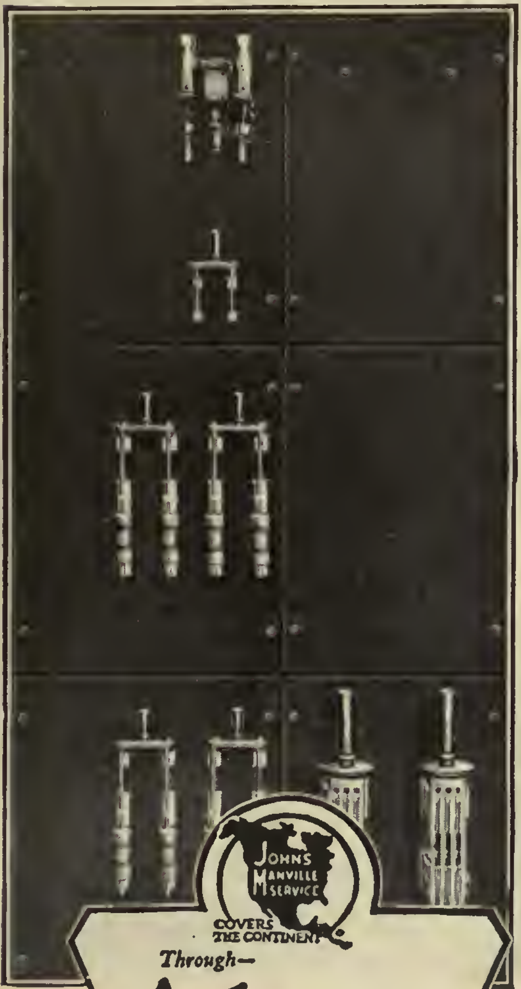
BACK in the old days of sixteen lamp arc light machines, when 30 K. W. dynamos were few and far between, the term "switch-board" was a correct descriptive title.

When switchboards grew on trees

For then electrical instruments were generally mounted on hardwood boards, hence the name. Occasionally from "unknown causes" these wooden boards caught fire, strange to say. But it wasn't long, however, until slate, soapstone and marble came into use—making the fire-proof switchboard a reality.

Quarried materials proved unsatisfactory

Unfortunately, high potentials and heavy currents with their attendant oil switches and massive circuit breakers quickly showed the need for greater mechanical strength and insulating properties than either slate, soapstone or marble possessed. These quarried materials, in addition to their lack of physical and dielectric strength, were often hygroscopic and generally contained fine metallic veins which permitted current leakage and ultimate disaster.



What an insulating base should be

So the progress in electrical development made necessary a fire-proof material of high, permanent insulating value, mechanically strong, easily worked, impervious to water and oil and of pleasing appearance.

Why Ebony Asbestos Wood is the strongest insulating base

Johns-Manville Ebony Asbestos Wood meets every one of these requirements. It is fire-proof, because it is made of asbestos fibres intimately mixed with extra high grade cement. It has a dielectric strength far greater than quarried materials. It is mechanically not only strong, but tough. It is non-hygroscopic; impervious to oil and water; is easily worked and resembles in appearance the best oiled slate.

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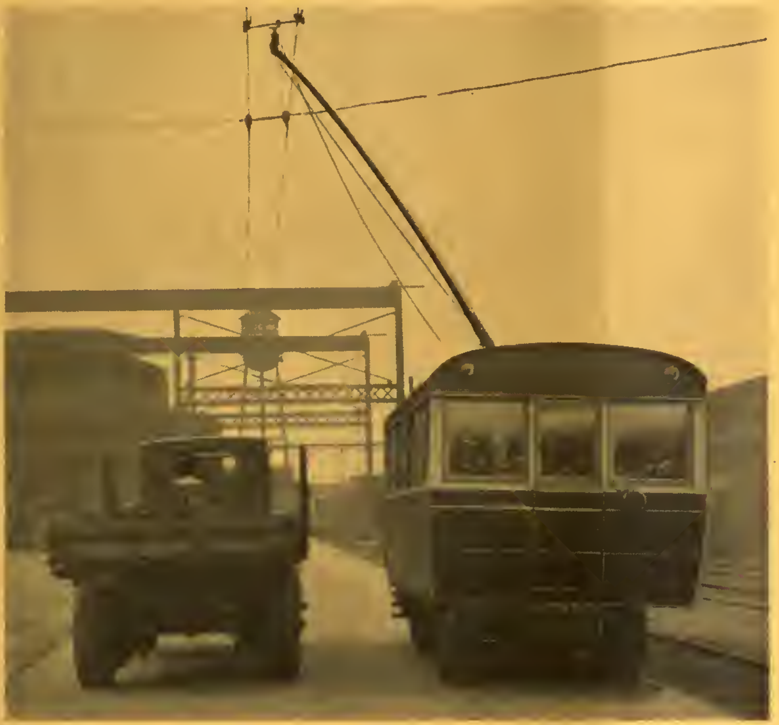

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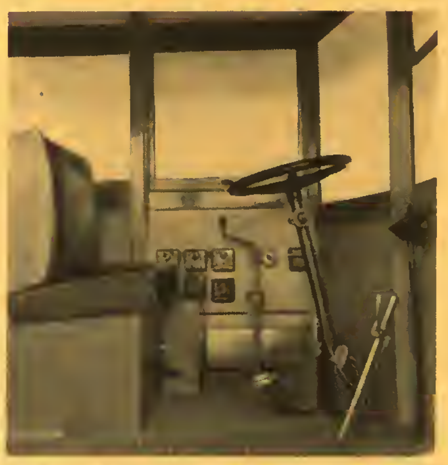

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